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W. H. BOARDMAN, *President and Editor.*

E. A. SIMMONS, *Vice-President.* RAY MORRIS, *Sec'y and Man'g Editor.*

R. S. CHISOLM, *Treasurer.*

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CONTENTS

EDITORIAL:

| | |
|--|------|
| A Committee Report on Rubber-Covered Wire..... | 1081 |
| Railroad Revaluation—with an Example..... | 1081 |
| Automatic Stops and Cab Signals..... | 1082 |
| New York, New Haven & Hartford..... | 1084 |
| Brooklyn Rapid Transit..... | 1085 |
| Atchison, Topeka & Santa Fe..... | 1086 |
| American Locomotive Co..... | 1088 |
| New Publications..... | 1089 |

ILLUSTRATED:

| | |
|--|------|
| Automatic "Light" Signals in Park Avenue Tunnel..... | 1090 |
| Progress of the St. Paul's Pacific Extension..... | 1095 |
| Construction of the St. Paul Pass Tunnel; C. M. & St. P..... | 1096 |
| A Novel Railroad Eating Station..... | 1100 |
| All-Electric Interlocking at New Haven..... | 1102 |

LETTERS TO THE EDITOR:

| | |
|-------------------|------|
| Private Cars..... | 1090 |
|-------------------|------|

MISCELLANEOUS:

| | |
|--|------|
| A Texas View of Railroad Regulation in Texas..... | 1093 |
| Recent Types of Express Locomotives..... | 1098 |
| Train Despatching by Telephone..... | 1101 |
| Austrian Petroleum Traffic..... | 1106 |
| The Legal, Economic and Accounting Principles Involved in the Judicial Determination of Railroad Passenger Rates..... | 1106 |
| Foreign Railroad Notes: | |
| Paris Subway in 1907..... | 1096 |
| Hungarian State Railroads..... | 1106 |

GENERAL NEWS SECTION:

| | |
|-------------------------------------|------|
| General News..... | 1109 |
| Traffic News..... | 1111 |
| Equipment and Supplies..... | 1114 |
| Railroad Officers..... | 1118 |
| Railroad Construction..... | 1120 |
| Railroad Financial News..... | 1122 |
| Annual Reports: | |
| New York, New Haven & Hartford..... | 1123 |
| Brooklyn Rapid Transit..... | 1127 |

The Railway Signal Association at its meeting in Washington next week will have a number of reports to consider, among them the highly important report of the special committee on rubber covered wire. The committee's investigation has been painstaking, and the results are of great value, but one subject has been left incomplete. It commends kerite, but does not provide a specification or test for it. The memorandum of the association of manufacturers contains the following sentence: "Inasmuch as wires insulated with kerite have been in use for 50 years, and have proved their merit, we suggest that a special specification be made for them,

in which the mechanical and electrical requirements be the same as called for by general specifications." The committee's comment is as follows: "The committee concurs, with the exception that it does not desire to present a specification for this compound." Kerite is made by combining a percentage of crude rubber with crude kerite. Crude kerite is a long ago discovery made by A. G. Day, one of the pioneers in the rubber industry. Its general nature and characteristics have been observed in practice for half a century; nevertheless, the formula for making crude kerite is a trade secret. The crude material is strong, elastic, an insulator and, unlike rubber, it does not deteriorate with age. It is, therefore, not an adulterant, for when amalgamated with rubber it has a preservative effect. The committee's recommended tests are chemical as well as physical. The recommended chemical tests are not applicable to kerite insulation, owing to the nature of crude kerite. The committee endorses the statement concerning its qualities made by the association of manufacturers, as well as by the makers of kerite; nevertheless, they arrive at an impasse by commending the material and at the same time presenting specifications and tests which, in so far as they can do so, would prevent its use. The solution is manifestly not easy, but there are many desirable results to be accomplished in this world which are not easy. Probably the easiest solution would be to exempt kerite from chemical tests and rely on the remaining tests of efficiency which the committee recommend. Kerite is defined in the Century and other dictionaries; that is to say, it has won its place and its use, and it is highly improbable that either the committee or the association desire to take such action as will tend to make it unavailable.

RAILROAD REVALUATION—WITH AN EXAMPLE.

President Mellen, in his annual report to the stockholders of the New York, New Haven & Hartford, gives us a clue to the results of the revaluation by Vice-President Stevens of the plant and other assets of that corporation. President Mellen mentions as an incidental fact that the company's regular dividend of 8 per cent. signifies less than 4 per cent. on the replacement value of the property. This means that, in the general balance sheet, we can double the book value entry of \$246,308,464 covering railroads owned or operated, with equipment, boat equipment, and the street railways and equipment, giving us, after the duplication, \$492,616,928. Add to this, in the schedule of assets, investments and advances, materials, some real estate, operation balances, bills receivable, cash (\$23,153,279), marketable stocks and bonds, assets in special funds, and some minor items taken at their book value, and there is to be added \$122,189,771, giving us as a total for the whole revaluation the stalwart sum of \$614,806,699. The figures are, of course, only approximate. For one thing, values have undoubtedly dropped somewhat since the revaluation was begun, and the revaluation itself is probably liberal to the company. But if we take the round sum of \$600,000,000 it probably represents about the real amount; and we may add that, in a rough way, the round total has been semi-officially confirmed.

The revaluation is interesting in itself apart from its bearings upon side questions. The New Haven is an old line with its basic stem opened some 60 years ago; with its various railroad increments it has taken in territory of very dense and increasing population, including many cities and large towns, and with great terminal properties at New York and Boston, and its larger purchases of realty, many of them made years ago at prices relatively cheap as compared with to-day; and its properties, boat, street railway and the rest, are widely diversified in character, saying nothing of the great value of the franchises which, we assume, are not included in the technical revaluation. Again this, if we are not mistaken, represents the first really systematic revaluation of any of the

great railroad systems of the country. It is obviously to be sharply distinguished from the crude, hasty and unscientific valuations based on foggy generalities attempted by some of the states in order to "squeeze out" alleged watered stock.

It can be scanned from a number of viewpoints. From the standpoint of the stockholders, if we exclude contingent liabilities of some \$31,000,000, subtract the other liabilities and capitalize and deduct the rentals, it would be possible to show in the asset balance a book value of at least 2 to 1 for the stock. This, doubtless, has a sentimental comfort for stockholders. Men like to know that their stock certificates represent a large margin of actual values. But it is, after all, chiefly sentimental. A railroad is intrinsically and fundamentally a going concern, which must keep going along fixed lines. It is not, like a piece of realty or a mass of merchandise, a form of property which can be cut up, transmuted, exchanged for another shape or type of property. The railroad stockholder has to remind himself constantly that a large fraction in his property represents a plant of more or less stationary value for railroad purposes, while absolutely necessary for the railroad to have. In the final analysis he has to ask himself the two vital questions to be asked by the seeking railroad investor—what is the railroad's *net* earning power? and how likely is that earning power to continue, or to increase, or to decrease? The great increment in the revaluation of an old railroad property, no doubt, in large measure, often implies good management or wise and forethoughtful purchase; but in larger degree it is apt to reflect growth of realty values due to waxing population. In a case like that of the New Haven, and many like it, we have yet another increment—reorganized lines, or unprofitable lines not reorganized, bought in very cheap—as compared with replacement cost—and later made profitable in themselves or as tributaries. New Haven examples are the old New England line and "town aid" roads like the Boston Air Line, the Valley, and the Connecticut Western. Here the stockholder has something better than sentimental reward.

Next we have the relation of the revaluation of an old system like the New Haven to taxation. Theoretically, a revaluation that shows a high margin of replacement value is a temptation to increased taxation, and there are politicians and demagogues who will yield to it. But the proposition is the height and depth of absurdity. Take the case of the New Haven, now essentially taxed as a corporation on stock and debt. It owns three-quarters of the South station at Boston, which cost some \$15,000,000. As a terminal the New Haven loses *net* some \$500,000 a year in the occupancy and operation of the terminal. During the coming 50 years the value of that property as Boston realty may double in a "revaluation." But children and their children will probably grow gray before the station becomes self-supporting, saying nothing of tens of millions of accrued loss. The inequity of increased taxation for such a property goes with the statement. Taxation, like investment, should rest at last upon the returns of a railroad property to its owners. Finally, in the case of the New Haven revaluation, we have its lesson for states that propose revaluations to eliminate water and thus find the basis of an "alleged" fair return on original investment. The New Haven Company, in its trolleys, has an immense volume of water—very little relatively in its steam and marine lines. But the revaluation, based on replacement, shows that the system as a whole is not merely not watered but extremely desiccated—the water not only dried out but replaced by solids. How a state can deal with such a problem is enigmatical. If a "watered" road is to have its dividends reduced by the state, why shouldn't the state vote a dividend to a road that is solidified.

Such are some of the deductions from the primary revaluation of a great and unique American railroad system undertaken and carried through by itself. They are edifying and do not have to wait for the revaluation to be accurately set forth to be instructive.

AUTOMATIC STOPS AND CAB SIGNALS.

In view of the fact that a committee of the Railway Signal Association (of which W. H. Elliott, of the New York Central, is chairman) is going to report on the subject of automatic stops and cab signals next week at Washington, it will not be out of place to review briefly the situation in that field at the present time. We shall not go into history, for that would involve a search of the patent office, which might lead back to prehistoric times. The first man who thought of a cab signal flourished a good while ago. The earliest historic item in connection with this subject which is worthy of note for our present purpose is that contained in a catalogue which was issued by the Union Switch & Signal Company in 1889. On page 284 of that catalogue there is an illustration of a semaphore signal fitted with an arm designed to extend athwart the track and break a glass on the top of the locomotive cab. The breakage, liberating compressed air, could be made to apply the brakes, sound a whistle and shut off steam. The device is recommended in the catalogue as "a most desirable feature to be introduced in block signaling." In point of fact the arrangement seems to have been so little desired that for 18 years its merits were completely ignored, so far as any real use of it was concerned. But a device working on the same fundamental principle has lately been put up on one of the Erie's lines near New York city (the Northern of New Jersey) and six more signals on that line are now being fitted with the stop. The adverse unanimous verdict of nearly 20 years is not to be taken as universally conclusive, therefore. Aside from this experiment all devices of this class under consideration which are now in use are arranged to work beneath the engine or car.

The present status of this art—that is to say, an account of the devices now in use—may be set forth in brief space. While the two purposes indicated (1) to call a careless engine-man to his duty, and (2) to stop a train in spite of an engine-man's carelessness—naturally are considered together, the two schemes have been carried out independently except in the Erie experiment just mentioned. Those roads which have automatic stops have no cab signals and those which have cab signals have no automatic stops.

The cab signals now in use are on the—

1. Northern of France.
2. North Eastern (England).
3. South Eastern & Chatham (England).
4. Great Western Railway (England).
5. Erie.

Automatic stops are now used on the—

1. Boston Elevated.
2. Interborough Rapid Transit (subway) (New York).
3. Hudson & Manhattan (Hudson river tunnel between New York and Hoboken).
4. Philadelphia Rapid Transit (elevated).
5. London underground lines.

In addition to the foregoing there should be mentioned Boulton's induction cab signal, which was tried on the Manchester, Sheffield & Lincolnshire, and was described in the *Railroad Gazette* of May 21, 1897. We mention this, notwithstanding the fact that it has been long neglected, because it embodies a principle generally recognized as having merit.

1. The Northern Railway of France is equipped with electric contacts, by which a whistle is sounded in the cab of the locomotive when a distant signal is passed at caution. The apparatus has been used on the line for 20 years, and at the present time it is in use throughout the company's lines. It is, however, an open circuit arrangement, and as the silence of the whistle in the cab means "all right," a failure of the battery or the breakage of a wire would give a false clear signal.

2. On the North Eastern (England,) Raven's mechanical cab signal, described in the *Railroad Gazette* of March 8, 1901, has been in use since 1895, and for several years on over 100 miles of road and on 100 or more locomotives.

In this system, as in the electric system on the Northern of France, silence means "all right," so that a breakage or failure of the apparatus might give a false clear signal. Mr. Raven has within the past two years introduced an electric cab signal which he proposes to use in place of the mechanical signal. This was described in the *Railroad Gazette* of Feb. 14 and 21, 1908. With his electric arrangement Mr. Raven proposes to give, at diverging routes, distinctive signals for the different routes; but we have no report of the use of this modification. The apparatus has been in use two years.

3. The apparatus on the South Eastern & Chatham is that of Bouneville & Smith. It is an electric contact cab signal, arranged to give proceed indications. It has been in use experimentally about one year at moderate speeds. Where a train is held at the home signal, it is designed to have the engines stop over a long contact rail and, by means of an electric connection with this rail, telephone communication is established between the engine and the signal cab.

4. The cab signal on the Great Western of England was described in the *Railroad Gazette* of Nov. 15, 1907. This apparatus gives proceed indications and takes the place of visual distant signals. It has been in use on a single-track branch line for over a year and is being installed for experimental use on the main line. One of the engines fitted with this signal has a hollow iron arm depending from the under side of the cab, which can be heated by steam for the purpose of melting snow or ice off from the ramp on the roadbed.

5. On the Northern division of the Erie Harrington's cab signal has been in use for about a year, and the company is now preparing to equip a considerable number of signals and a considerable number of engines. With this apparatus the contact is made on the top of the locomotive cab, and it is both a cab signal and an automatic stop; the striking of the signal arm by a bar fixed on the locomotive exhausts air from the air brake pipe and, at the same time, sounds a whistle.

An electric contact scheme is in experimental use on the State Railroad of Belgium.

The Boston Elevated and the roads shown below it, in the list given above, are all electric lines, and the automatic stops, giving no signal in the cab, work in connection with automatic block signals. All of these automatic stops move a trip (fixed on the track) into position to open an air brake valve on the leading car of a train; and all are worked by compressed air except those in the Hudson river tunnel, where electric motors are used instead. On the London lines, which are operated by several different companies, there are about 1,000 of these automatic stops.

So much for the facts. In forming any estimate of the facts of the situation certain collateral considerations should be borne in mind. The oldest installation is No. 1, the Northern of France; but although this example is almost in sight of England, the English roads, though they have much trouble with fog, have not copied it. The French experience (with open circuits) affords no aid in the solution of the principal questions that American signal engineers raise, in connection with this problem. Raven's mechanical cab signal (No. 2) has been in use since 1895, but it seems to have found no favor with other companies, and the inventor is superseding it with an electric signal. It is proper to say, however, that this mechanical cab signal has given such a good account of itself that, where it is regularly used, the usual English arrangement of assigning fogmen to each fixed distant signal in times of fog, is done away with. Both France and England are quite free from disturbance by snow, as compared with the northern states of America. England has dense and protracted fogs; but some of the roads which suffer the worst from this cause, seem to be wholly oblivious to the merits of cab signals.

The Great Western cab signal (No. 4) is comparatively new; but its simplicity and the satisfactory way in which it serves as a substitute for fogmen have commended it to the

Chief Inspecting officer of the Board of Trade, Col. Yorke, (*Railroad Gazette*, Feb. 28, 1908), and it is used, with the consent of the Board of Trade, as a substitute for—not an adjunct to—visual distant signals.

All of these European cab signals evidently have been introduced on the theory that the desideratum is to make sure that the engineman may know when he passes each distant signal, and may know its indication. Provision against dangers arising from enginemen dropping dead, or from recklessness or insubordination appears not to have been thought of.

Coming now to the Boston Elevated and its followers we have a different situation. These have the automatic stop, but no cab signal. All of these roads are practically free from snow troubles and so are relieved from one of the objections brought by most signal engineers against movable apparatus on the roadway or any contact device near the ground. All use electric motors and so have to do without the real or supposed advantage of having a fireman to aid the driver in keeping a lookout for signals. This, no doubt, was an important factor in their decision to use automatic stops. The extreme density of traffic was another. The regularity of the traffic and of the length of trains is an advantage, in using automatic stops, which would be wanting on the ordinary standard railroad.

These electric lines afford the only large body of experience which throws light on the problems, either of the automatic stop or the cab signal. The officers of those lines which have used the stops longest speak approvingly of them, and the stops have actually prevented collisions. That the stops have made fine records for long periods without failure has been often stated. Whether or not there are other records, not so free from failures, which have not been made public, is a question on which light is needed. The inspection of these city railroads is as thorough, probably, as any railroad inspection in the world. This fact is to be kept in mind, when considering the question of the general introduction of automatic stops, for one objection which is always brought against any proposal to introduce mechanical or electrical refinements in railroad practice, is the difficulty of securing efficient inspection.

In our list of things accomplished we have included Boulton's device, though it was tried for only a short time and was then taken out. We do this because by reason of the serious objections which are always raised against the use, in exposed places, for fast trains, of any kind of contact device, it seems proper to give careful attention to any successful experiment with apparatus which accomplishes the desired end without depending on contacts. All contact apparatus, whether "ramp" or steel brush, or a lever to be violently struck, are viewed with suspicion by railroad officers who have had severe experiences with snow and ice. That Boulton's device was successful is attested by responsible officers of the road on which it was tried. It was taken out because the management of the road, having engines of several foreign lines constantly traversing their tracks, objected to any system requiring engines to be specially fitted.

The Miller cab signal has been tried, but is not now in use. The same may be said of Phillips' cab signal, which was tried on the North Staffordshire road. The Rowell-Potter apparatus, which was used on the Chicago Elevated lines, is mentioned below.

We have made this review because of the action of the Railway Signal Association. The Association has acted chiefly, no doubt, because the United States government has acted; and the action of Congress was based on a statement that automatic stops ought to receive consideration at this time because of the high degree of perfection which they have attained. But whether any or all of these events or activities mark real progress is a question which is yet to be answered. The examining board which was appointed by the Interstate Commerce Commission in 1907, has thus far spent its time mainly

in the examination of incomplete inventions, most of which have not even been tried. The board has examined those automatic stops which are in use—on the New York subway, the Boston Elevated, etc.; and those cab signals which have been developed in Europe—chiefly those on the Great Western of England, the North Eastern of England and the Northern of France; but so far as new devices are concerned, it has thus far examined only one which is in actual operation—that on the Chicago, Burlington & Quincy, of which notice was given in the *Railroad Age Gazette*, July 24, page 572. Even this is not wholly new. It is new in the sense that the installation represents the latest ideas of the Rowell-Potter people, who have made other installations during the past 15 years, and whose earlier devices are already known to railroad officers. No report has yet been made on the Burlington installation. The extent to which the railroads of the country agree with Congress concerning the desirability of extending the use of automatic stops, and the degree in which the conservatives endorse the claims of the enthusiastic inventors who are constantly bringing out new and "original" devices for insuring the safety of railroad travel, will probably be brought out in the discussion of the committee report before the Association at Washington.

NEW YORK, NEW HAVEN & HARTFORD.

Considered as one of the great railroad systems of the country the New York, New Haven & Hartford occupies a unique situation territorially. It is a monopoly well nigh complete; it handles an immense passenger traffic falling not much below its traffic in freight and far exceeding it on its main line; and it taps a territory which produces almost no new material and low class freight. It carries in Connecticut, Rhode Island and Massachusetts almost nothing that comes directly out of the ground. Its main business comes from the factories and from raw material that has been worked up. A factory region is apt to be the first to feel the shock of panic and the later stress of financial and industrial depression, and it is apt to feel them suddenly. That fact gives the returns of the New Haven company for a year that includes more than six months of financial stringency peculiar interest and value.

A table giving earnings by months in the report show the results that were logically to be looked for. As compared with the previous year July of 1907 showed an increase in gross earnings of all kinds of \$347,308; August, \$534,954; September, \$198,614; October, \$369,665. Then the earnings fell suddenly as if struck off by a knife. November returned an increase of but \$3,146; December a decrease of \$283,732; January of \$628,965; February \$389,442; March \$737,881; April \$451,206; May \$900,482, and June \$613,789. In the first five months of the fiscal year gross earnings increased \$1,453,689. In the last seven months they decreased \$4,005,478. The contrasted figures give a dramatic picture of the impact of hard times upon a factory region and the reflection on railroad traffic. Freight business was, of course, hit first but in the later months the passenger business dropped also.

Coming to the main body of the report one finds new classifications and transferred items which make some of the comparisons very difficult. One must often deal with summaries and generalities rather than precise figures. This is doubtless due in part to the accounting orders of the Interstate Commerce Commission.

Gross earnings from operation fell from \$55,601,936 to \$53,050,137. But operating expense rose from \$37,850,081 to \$38,213,557, and the operating ratio to gross from 68.07 per cent. to 72.03 per cent., including a rise of the maintenance charge from \$5,479,089 to \$5,983,825—this in spite of large savings in demurrage charges and heroic reduction of expenses during the last quarter of the year, which included the cutting of salaries,

curtailment of train service and discharges of men. The inference is fair that the anomaly is to be explained by the Interstate Commission orders, notably that insisting on the depreciation charge. Receipts from all other sources carry the total income after operation and taxes to \$19,816,956 with deductions in fixed charges by interest rentals and hire of equipment (altogether \$14,550,387), leaving \$5,266,569 for dividends as contrasted with \$8,893,041 last year. A surplus over dividends of \$1,988,053 last year thus changes to a deficit of \$2,516,692. The outstanding stock in the hands of the public is \$97,895,700, which at the regular 8 per cent. dividend calls for \$7,831,656. The road thus lacked \$2,565,087 of earning the dividend requirements, or a little more than 2.5 per cent. It earned about 5.5 per cent. and paid 8. But with the accounting made as last year there was probably about 6.5 per cent. for the dividend and the deficit is materially reduced. As in the case of other railroad companies of standing which have paid unearned dividends—nominally from past surplus—the policy of the New Haven has been one of hope looking to the revival of business. But unlike some other corporations it has the comfort of cash on hand amounting to \$23,153,279 and sufficing for all maturing obligations probably up to January, 1910. This gives it the fiscal timber to bridge the gap in business and no doubt influences its dividend policy. Its stock and convertible debenture holders during the year have, by the way, received "rights" equivalent to about 5 and 3.5 per cent. dividends respectively if they sold, and about double these figures if they took their "rights" up. Excluding merger debts assumed during the year the debt of the company has increased by \$37,541,870, but this, presumptively, must be decreased to \$14,388,591 by the subtraction of cash on hand which is to be used largely to meet maturing obligations.

Summarized in a broad generality the situation finds the New Haven road with debt expanded but with cash to meet demands for fifteen months to come and meanwhile waiting and hoping for a traffic revived and with the most drastic economies in force. It has one element of hope denied to some other lines. If the industrial depression hits a factory region quick and hard so does revived prosperity. It has been stated authoritatively since the report was issued that the September (1908) business indicates a decided revival of the freight traffic. On the other hand the summer passenger business to and from New England summer resorts has somewhat unexpectedly fallen—a loss attributed largely to the automobile—and a hot summer failed to sustain the trolley traffic which had held up well in the spring. The latter is attributed to low funds of the unemployed who at first had nickels to use. But close economies on the large trolley systems of the company have made the net showing much better than last year.

Perhaps the most interesting branch of President Mellen's bold policy in the past has been his absorption of electric railways which have included practically all the street railways in Connecticut and Rhode Island and several hundred miles in Massachusetts. The suit against the company in the latter state to alienate the trolleys and the necessity of avoiding technical admissions in the report that could be used in court now prevent all survey of that subject. The earnings of the Massachusetts trolley are evidently not returned even in the general net receipts from the street railways; and the Connecticut and Rhode Island trolley statements are presented under new schedules. It can be stated, however, that the trolley lines during nine months of acute business depression make a much better showing both relatively and absolutely than the steam system. Pursuing the same policy of non-admission pending litigation the same gap appears in the report in connection with the Boston & Maine stock purchase of 109,948 shares which figured in last year's report in the text and also under the head of "other investments." It now disappears. But it will be noted that treasury stock of 239,824

shares originally issued to buy up the remaining Boston & Maine stock is still held. The outcome depends upon the government suit. Meanwhile during the period that the merger is held up the New Haven at least escapes the grave responsibility of Boston & Maine physical organization at a cost represented by the difference in dividend between the two roads on 109,948 shares.

President Mellen makes in his report the significant statement that "a recent valuation of the company's property indicates that an 8 per cent. dividend amounts to a return to stockholders of less than 4 per cent. of the replacement value of their property." Stated differently this means that the property, as recently revalued in the investigation by Vice-President Stevens, is worth more than double its cost. In the general balance sheet the cost of properties is returned as \$246,308,464 exclusive of the Massachusetts trolleys and of outside investments of nearly \$80,000,000. The Stevens revaluation as applied to the \$246,308,464 would indicate about \$492,616,928. If applied to the whole asset summary of the sheet (\$368,498,235) it would indicate about \$736,996,470. If we duplicate the book value of plant and equipment and let the rest of the assets in at book value we get what is probably the much more accurate valuation of about \$600,000,000. Due allowance in such a case must obviously be made on the plus side for the enormous increase of value of property—especially realty—of a road now more than half a century old and on the minus side for its actual value as railroad property measured by net earning power.

Some special features of the report must be briefly noted. The panic found the company bound to many contracts the fulfilment of which appear in additions to rolling stock and some 40 physical improvements, including 34 grade crossings eliminated. Last year's deficit of \$330,419 in operation of the Central New England changes to a surplus of \$335,868 now that the Poughkeepsie bridge has been repaired. The Sound boat lines on operation returned \$481,513 over expenses as compared with \$635,127 last year—a decrease due presumptively to both rivalry and the traffic depression. The Milbrook purchases, potential basic lines for new terminals in New York City, are entered at book value of \$11,762,483.

What President Mellen has to say about economies so clearly expresses a familiar railroad condition as to be worth its quotation:

"It was a difficult task to reduce the expenses from the high-water mark that had prevailed to December 31, 1907. The public have yielded, although most unwillingly, to a moderate reduction in service and facilities; the employees have been reduced in numbers but not in their rate of compensation; the officials have had a cut in salaries, but the great items that enter into the cost of conducting the affairs of a public service corporation are still at the highest mark of the most prosperous times of recent years, and, unless labor and those controlling the price of materials share the necessary liquidation, it is inevitable the price of transportation must be advanced in order that a reasonable return be had upon the money invested. It must be admitted there is an economic fallacy somewhere in a policy that results in an advance in prices during a period of extreme depression, but it is impossible for any one interest to bear the burden of high prices for the major portion of what constitutes its cost of production, and with a constantly diminishing volume of business be barred from receiving a sufficiently remunerative return upon the same."

Annexed are the principal statistics of operation:

| | 1908. | 1907. |
|----------------------------|--------------|--------------|
| Mileage worked | 4,310 | 4,332 |
| Gross earnings | \$53,050,147 | \$55,601,929 |
| Freight earnings | 25,281,434 | 28,386,704 |
| Passenger earnings | 23,003,115 | 26,758,929 |
| Operating expenses | 38,213,557 | 37,850,081 |
| Main. way and struc. | 5,983,825 | 5,479,089 |
| Net earnings | 14,836,589 | 17,751,854 |
| Net income | 5,266,569 | 8,893,041 |
| Surplus for the year | *2,516,692 | 1,988,053 |

*Deficit.

BROOKLYN RAPID TRANSIT.

A city rapid transit system has much less to fear in a period of commercial depression than a steam railroad has, because it has no freight traffic of consequence to lose, and that portion of the working population which is not actually out of employment can be counted upon to continue furnishing rush-hour traffic. Pleasure traffic, however, is affected very directly in a hard-times year, and the Brooklyn Rapid Transit, with its summer resort lines, carries a great deal of pleasure traffic, particularly in the summer months. The balancing of these conditions on the Brooklyn Rapid Transit in the fiscal year ended June 30, 1908, produced about the effect that might have been expected; that is to say, gross earnings showed a small increase for the year over the previous year, although this increase was materially less than the normal one. It is probable that the 1909 fiscal year has already felt some unfavorable influence from the falling off in pleasure traffic during July, August and September, as compared with the same months last year, but this reduction in earnings again bids fair to be offset by normal increases during the present fiscal year, so that the general financial returns at hand, as compared with those of any steam railroad, which we have as yet reviewed, show up well, and the company's position appears to be a strong one.

President Winter points out that the opening of the subway for regular operation between Battery Park and the terminus at Flatbush and Atlantic avenues, Brooklyn, has somewhat affected the revenue of certain lines, but no materially harmful results to the business of the company have been manifested, and none are expected from this addition to the lines of communication between Manhattan and Brooklyn. In a case like this it is obvious that it is not merely passenger movement on lines passing through the vicinity of the subway that has to be considered, but also changes of current at apparently remote points. The very fact of the establishment of these new subway stations in a part of Brooklyn, hitherto rather difficult of access from downtown New York, must of necessity create new business, arising from the building up of the locality. The Brooklyn Rapid Transit ought to be very glad to have as many new residents as possible brought to Brooklyn with their families. Whether or not the new residents themselves travel over the B. R. T. on their way to and from work, their families are certain to use it in greater or less degree for daily travel, outside the rush hour limits. The long haul from remote points in Brooklyn to and across the Brooklyn Bridge for a nickel, during the hours of maximum congestion, is by no means the most profitable work which the Brooklyn Rapid Transit Co. can undertake, and its geographical situation is such that it ought to profit quite certainly from the development of the alternate route from Brooklyn to New York through the subway. It takes time, however, to develop this family traffic, and the guess may be hazarded that there was a temporary loss, amounting to perhaps a thousand dollars per week-day, following the opening of the subway extension.

Gross earnings from operation were \$19,870,567 in 1908; an increase of \$488,979. The increase in operating expenses was somewhat smaller than the increase in earnings, and the income from miscellaneous sources increased \$122,658; but taxes and fixed charges were \$508,552 higher than they were last year, so that the resultant net income decreased from \$2,444,662 in 1907 to \$2,073,873 in 1908. From this net income \$229,781 was charged to betterments, and a surplus of \$1,844,092 was carried forward for the year.

In our issue of July 17, we raised the question whether or not it paid to furnish rapid transit to great cities under present conditions. In the old horse-car days it paid exceedingly well. The lines were short and gave few or no transfers; then they were electrified at great cost and, after a comparatively few years, the original electrical equipment was in most cases thrown away, owing to rapid improvements in the art,

and new equipment was installed at still greater cost. Meanwhile, the tendency to extensions was continuous, but the prevailing rate of fare remained at 5 cents, while throughout this extension period consolidations were continually being made, until it generally happened that almost if not quite the entire street railway mileage of a given city would be owned by one corporation, and hence compelled by statute or by strongly expressed public opinion to give universal transfers at all intersecting points on the lines.

This matter has been presented before, but it needs saying again and often. Street railway development in the last decade has been so extraordinarily rapid that people and communities have entirely forgotten how much they are getting, as compared with what they used to get, and how little they are paying for it. Mr. Winter points out in the current Brooklyn Rapid Transit report that "encouraged by the rapidly increasing demand for more and better local transportation, and the assumption that the gross rate of 5 cents for the carrier could be substantially preserved, enormous expenditures have been made in the improvement of existing facilities and the creation of still more costly means of transit, and these vastly enhanced conveniences have been turned to public use without increase in the rate of fare. On the contrary, through the growth of transfers, the average gross return per passenger has been decreasing until the cost of transportation supplied per capita and the amount received for it have come unpleasantly close to each other." As an example of the kind of service which the company has to all intents to give to the public free of charge, as a result of this extension and co-ordination of the system, it should be noted that at the present time some 13 per cent. of the Brooklyn Rapid Transit's car mileage is on the bridge proper and yields no return, except for the insignificant payments from passengers who cross the bridge without continuing their trip. It was a public necessity that the trolley cars should cross the Brooklyn Bridge, but the mistake was made earlier in the history of the company in the terms arranged with the city. There was no reason why the company should have paid the city anything for the privilege of operating $1\frac{1}{4}$ miles of track for nothing! Yet the actual operating loss (capital charges not included) from the bridge mileage, 1900-1907, was \$4,410,872.*

There were carried 515,184,967 passengers during the fiscal year ended June 30, 1908—a number equivalent to more than six times the population of the United States! The average gross earnings per passenger were 3.67 cents, and the average cost per passenger was 2.25 cents, leaving an average net per passenger of 1.42 cents, which had to provide for bond interest, taxes and all charges except operation. It appears to the observer that this extremely narrow margin could be bettered in either one of two ways; by a flat increase of fares, as in the case of the Boston & Northern, or by curtailment of the transfer privilege. A flat increase of fares is plainly out of the question, however, under present conditions in Brooklyn, and a reduction of the transfer privilege seems a much more hopeful method, particularly as the rapid transit public across the river has seen transfer privileges so much reduced by order of the United States court during the last six months that the spectacle does not raise the tumult it formerly did.

It is a noteworthy tribute to the ability of Mr. Winter that in the face of unceasing discouragements and a bitterly hostile public attitude, he has been able to place his company on a profitable commercial basis, to raise its solvency above question, to take it out of politics and to provide for a comprehensive plan of general betterment work, much of which has now been carried out, while the financing of the property is now in such strong hands that it can obtain necessary funds at much lower cost than formerly. It remains for the traveling public and for the self-chosen public champions in the daily press to realize that good service is not to be had for nothing, and that, measured by the general scale of the world's commodity prices, the

inhabitants of great cities, and notably of the greatest cities, are traveling long distances a good deal cheaper than they have any right to, by courtesy of the traction consolidations which they so heartily denounce.

The following table compares the 1908 operations of the Brooklyn Rapid Transit Co. with those of 1907:

| | 1908. | 1907. |
|-------------------------------|--------------|--------------|
| Gross earnings from operation | \$19,870,567 | \$19,381,587 |
| Operating expenses | 11,939,579 | 11,465,705 |
| Net earnings from operation | 7,930,988 | 7,915,882 |
| Income from other sources | 677,824 | 555,166 |
| Total income | 8,608,812 | 8,471,048 |
| Taxes and fixed charges | 6,534,939 | 6,026,387 |
| Net income | 2,073,873 | 2,444,662 |
| Betterments | 229,781 | 442,063 |
| Surplus for the year | 1,844,092 | 2,002,598 |

ATCHISON, TOPEKA & SANTA FE.

The Atchison, Topeka & Santa Fe has come through the past year in much better shape than appears from its income account. The road has suffered severely from its inability to hold down operating expenses, and on a casual examination of the report for the fiscal year ended June 30, 1908, the fact that the operating ratio was 67 per cent. last year as compared with 62 per cent. in 1907 is apt to give an impression of inefficient operation, which on closer examination will be found to be quite wrong. For the last 12 years the Santa Fe has been expanding its territory, improving its roadbed and equipment and acquiring valuable new lines to an extent equalled by few other roads, and during this time it has had both gross and net earnings more than proportionate to its increase in mileage, while at the same time its funded debt and capital stock outstanding have by no means been increased in proportion to the increase in earning power.

The policy has been one of expansion, clearly warranted by a constantly increasing business so that now, when in the opinion of the directors and officers business no longer holds out prospects of increased return on added mileage, the company can stop short and turn its entire attention to development of its already existing lines. Capital requirements have been fully met; the improvements that have been under way in the last few years are now nearly completed, and during the next year the net earnings of the road should show the results of these improvements. On June 30, 1907, the company had under construction 488 miles of new railroad, and on June 30, 1908, in addition to an increase of 142 miles in lines operated, it had completed that portion of the Eastern Railway of New Mexico, Texico, N. Mex., to Rio Puerco, 278 miles, and the Arkansas Valley extension 107 miles.

To pay for these additions and for betterments and for other purposes the company issued \$4,000,000 general mortgage 4 per cent. bonds and \$3,475,000 Eastern Oklahoma division bonds, and \$26,056,000 convertible 5 per cent. bonds (of which about \$9,000,000 was subscribed for at par by stockholders and the remainder sold to J. P. Morgan & Co.) Subtracting from the sum of the new bonds issued the obligations purchased or retired we find that the company increased its funded debt during the year by \$31,282,870. In addition, since the close of the fiscal year the company has sold \$17,000,000 Transcontinental Short Line first mortgage bonds, secured by a mortgage on the Belen cut-off and other newly acquired or built lines aggregating 695 miles. It must be borne in mind that during the year under review the company has derived no advantage from the Belen cut-off as a through passenger and freight route between Chicago and San Francisco, so that the large estimated savings in operating expenses that are to come from its use for this purpose in connection with the Panhandle division are not in any way reflected in the annual report. When one considers that the new line will have a maximum grade of 1.25 per cent. and has only one grade westbound of over 0.6 per cent., while the La Junta division in use during 1908 had two grades of 3.5 per cent., it does not seem too much to expect that much time can be saved by passenger trains between Chicago and San Francisco, and substantial sums saved in cost.

* The details of this computation are worked out in a footnote on page 508 in our issue of July 17.

of conducting transportation in the freight department.

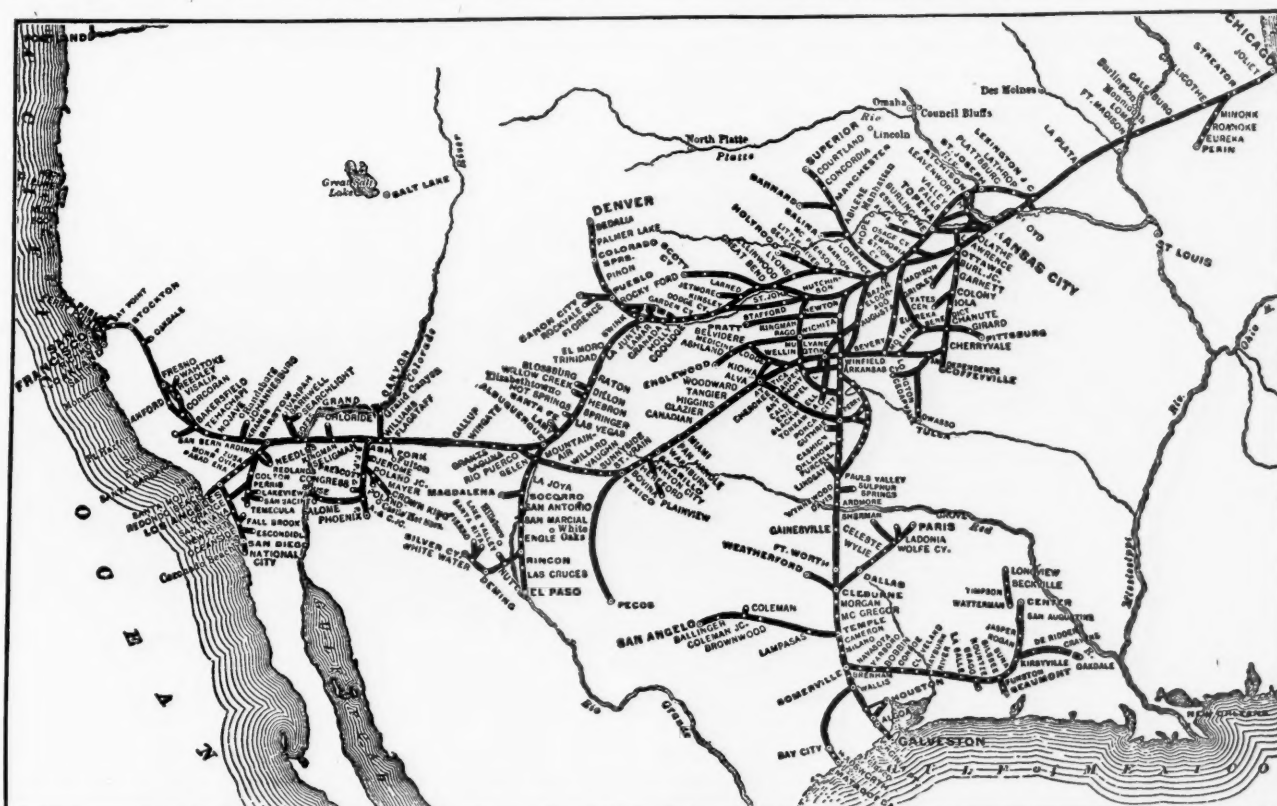
Gross earnings, although large for the first six months of the fiscal year, fell off for the whole year \$4,000,000, being \$90,600,000 in 1908, while operating expenses increased by \$2,000,000, being \$60,800,000 last year. Of the decrease in gross earnings the loss in revenue from freight was over \$4,000,000, while passenger earnings increased from \$21,200,000 in 1907 to \$21,600,000 in 1908. The largest proportionate increase in operating expenses was about \$2,000,000 for maintenance of equipment, this account showing \$14,000,000 spent in 1908. Conducting transportation also increased by \$1,600,000, being about \$28,500,000 last year.

The sums spent for maintenance of property by the Atchison during the last 12 years has been extremely liberal, and the year 1908 was no exception. An average of \$1,500 was spent for maintenance of way and structures per mile of road operated, as against \$1,648 in 1907, and \$1,479 in 1906. In spite of the fact that there were added 81 locomotives and 6,566 freight train cars, maintenance of equipment, in-

the main by a shortage of wheat and cotton crops, which caused an average loss of about \$2,000,000, and by a reduction of traffic in miscellaneous merchandise and manufactured articles, causing a loss of another \$2,000,000.

Taxes were over \$3,000,000 last year, being 12 per cent. of income applicable to the payment of interest and dividends. This is an increase of \$740,000 over the preceding year. Part of this increase is due to the increased valuation of the property, due probably to the very nearly completed improvements and additions to the road, and partly to changes in the laws of some of the states through which the Santa Fe passes.

The balance sheet as of June 30, 1908, explains clearly what became of the proceeds of the bond sales during the fiscal year. There was \$22,000,000 expended for additions and betterments and charged to capital account, making the total valuation of railroad franchises and other property \$528,000,000. Material and supplies are carried at \$14,600,000, an increase of a little less than \$4,000,000. Cash on hand increased a little over \$1,000,000, being \$9,400,000 in 1908. At the same



Atchison, Topeka & Santa Fe.

cluding renewals and depreciation, cost \$3,714 per locomotive in 1908 as against \$3,037 in the previous year; \$1,040 per passenger-train car as against \$963, and \$106 per freight car as against \$103 in 1907. It is impossible to work these figures out on our usual basis of repairs and renewals because of the new methods of accounting prescribed by the Interstate Commerce Commission. It might be added here that wherever comparisons are made between the figures for 1908 and 1907, the figures for the earlier year have been rearranged to correspond to the form prescribed by the Interstate Commerce Commission. The maintenance of equipment figures are all the more liberal, because the Santa Fe has an unusually efficient shop system.

The average train load increased from 365 tons to 367 tons, 0.39 per cent., while the average freight revenue per freight-train mile decreased about 3 per cent. On the other hand, the average passenger revenue per passenger-train mile increased from \$1.13 to \$1.17, about 4 per cent., and the number of passengers carried one mile increased by 6 per cent., although the passenger-train mileage decreased about 1 per cent. The loss in freight earnings may be accounted for in

time, accounts payable decreased from \$13,700,000 to \$8,000,000, the greatest decrease being in audited vouchers payable, which were but \$3,000,000 as against \$6,900,000 in the previous year. In making improvements, reducing curves and grades, the policy of the company has been to charge the cost of old line abandoned to maintenance of way, and to charge to capital account only the difference between the value of the old and new line. Besides the cash on hand on June 30 there have been sold, as before mentioned, \$17,000,000 bonds, which probably gives the Santa Fe a working capital of something over \$25,000,000. This capital, when considered in the light of a remark by President Ripley that the Santa Fe has no plans for extensions or extensive improvements, is quite ample.

As yet the effect of the extensions of line into new territory on the character of freight traffic handled is slight. As was pointed out in the review of the annual report for 1907, the increase in the tonnage of cotton in that year came probably from the new lines acquired in Texas, but last year the cotton crop was poor, so that there were but 224,541 tons carried by the Atchison, a decrease of about 45 per cent. The ton-

nage of dressed meats and of other packing house products was considerably larger in 1908 than in 1907, the tonnage of dressed meats increasing about 100 per cent.

Taking the earnings and expenses of the road month by month during the past year we see that up to December operating expenses were on the increase, but that during the last six months of the fiscal year they decreased from \$5,400,000 in January to \$3,600,000. When the Belen cut-off is put in operation expenses ought to decrease even further, and with a return of business prosperity, net earnings ought to show a marked improvement. The policy of the directors in reducing the dividend rather than cutting expenditures for betterment and for maintenance, although it has had the immediate effect of lowering the price of the common stock on the New York Stock Exchange, ought in the long run to greatly enhance the earning power of the road and therefore the value of the common stock.

The following table, rearranged according to our usual method, shows the results for the last two years:

| | 1908. | 1907. |
|--------------------------------|--------------|--------------|
| Mileage operated | 9,415 | 9,273 |
| Freight earnings | \$61,848,639 | \$66,173,518 |
| Passenger earnings | 21,643,427 | 21,171,629 |
| Gross earnings | 90,617,796 | 94,343,308 |
| Maint. way and structures .. | 14,414,875 | 15,971,733 |
| Maint. of equipment | 14,376,338 | 12,398,159 |
| Conducting transportation .. | 28,487,035 | 26,867,503 |
| Traffic expenses | 1,796,691 | 1,767,127 |
| Total operating expenses | 60,823,964 | 58,770,704 |
| Taxes | 3,244,596 | 2,502,651 |
| Net earnings | 26,549,236 | 33,069,953 |
| Gross income | 27,221,147 | 33,823,121 |
| Net income | 13,678,886 | 22,084,985 |
| *Betterments | 421,710 | 9,791,226 |
| Dividends | 11,371,297 | 11,363,723 |
| Surplus | 1,885,879 | 770,873 |

*Including improvements and fuel reserve.

AMERICAN LOCOMOTIVE COMPANY.

The gross earnings of the American Locomotive Co. for the year ended June 30, 1908, were \$37,480,000, a decrease of \$12,030,000 as compared with the previous year. The extent to which the business of the company was reduced by the financial depression is better realized when it is understood that this falling off of \$12,000,000 occurred in a period of less than half a year, for while the general depression began eight months before the end of the fiscal year, the company had on its books orders which kept its plants in operation at nearly their full capacity until about the first of March. An indication of the amount of business being done on June 30, 1908, is the value of contract work in course of construction, carried on the balance sheet of that date at \$2,200,000; the corresponding amount a year previous was \$4,200,000. The expenses of manufacturing, maintenance and administration were \$32,500,000, a decrease of \$10,250,000, leaving net earnings of \$4,990,000, a decrease of \$1,780,000.

Profits after fixed charges were \$4,530,000, a decrease of \$1,830,000, equivalent, after paying 7 per cent. on the preferred stock, to 11.1 per cent. on the \$25,000,000 common stock. In the previous year, 18.4 per cent. was earned on the common. While the full dividend of 5 per cent. was paid on the common during the past fiscal year, as well as one quarterly dividend (August) since the close of the year, the quarterly dividend payable in November, 1908, was recently passed. The directors announced that they expected the company would be among the last to feel material improvement, and that they were therefore looking forward to the continuance of reduced earnings. Considering the great curtailment of output which, as pointed out above, the company has suffered since last March, this action of the directors seems properly conservative. The surplus after dividends was \$1,530,000, a decrease of \$1,830,000. In each of the two preceding years, \$2,000,000 was set aside from surplus for the extraordinary additions and betterment fund. This was not done this year, but \$500,000 was reserved for replacements and maintenance, this being a new fund. On June 30, 1908, there remained

\$1,990,000 unexpended of the betterment fund. The net credit to profit and loss was \$1,030,000, a decrease of \$330,000, making the total profit and loss balance \$8,470,000.

The American Locomotive Co. has no bonded debt, but four of its subsidiaries have bonds outstanding to the aggregate amount of \$2,967,500. The company, however, has outstanding \$4,000,000 short term gold coupon notes which mature in installments of \$1,000,000 each October. The original issue was \$5,000,000, the first instalment having been paid in 1907. During the past year, the company sold \$900,000 of preferred stock which it had held in its treasury, so that the entire \$25,000,000 is now actually outstanding.

During the year, the subsidiary companies owning the Richmond Locomotive Works, the Manchester Locomotive Works, the Rogers Locomotive Works, the Cooke Works and also the American Locomotive Automobile Co. were consolidated with the American Locomotive Co. In doing this, certain balances were adjusted, and this involved a charge of \$520,000 against the profit and loss surplus of the company. The surplus given above is that remaining after the deduction. Partly because of these consolidations, the cost of property, as given on the general balance sheet, was increased from \$46,930,000 to \$49,580,000. Assets were correspondingly reduced by the deduction of the capital stock of the Rogers Locomotive Works, heretofore carried at \$1,970,000, but the amount of sundry securities owned increased from \$410,000 to \$1,100,000.

The Montreal Locomotive Works, Ltd., has issued to the American Locomotive Co., at par, \$2,485,500 additional stock in payment of advances for extensions of its plant, making the total outstanding \$3,000,000, all of which is owned by the American Locomotive Co. The locomotive works at Providence have been closed, the capacity of other plants having been increased correspondingly, and the automobile plant alone is now operated at Providence.

During the year the foreign business of the company has increased, sales being made in Japan, Korea, China, Europe and South America. The Canadian business has also developed satisfactorily. A new item appearing among the assets is \$370,000 worth of steam shovels, contractors' locomotives and automobiles carried in stock.

The convertible assets and current liabilities as of June 30, 1908, and June 30, 1907, are as follows:

| Convertible Assets. | | 1908. | 1907. |
|---|--|--------------|--------------|
| Cash | | \$4,744,928 | \$2,654,230 |
| Accounts collectible | | 5,979,889 | 10,399,961 |
| Bills receivable | | 2,948,612 | 923,206 |
| Accrued interest | | 25,520 | 17,440 |
| Advances to Automobile Co. | | | 1,772,260 |
| Material and supplies | | 3,017,056 | 4,161,128 |
| Contract work in course of construction .. | | 2,204,085 | 4,195,943 |
| Steam shovels, contractors' locomotives and automobiles manufactured for stock .. | | 369,506 | ..... |
| | | \$19,289,596 | \$24,124,168 |
| Current Liabilities. | | 1908. | 1907. |
| Gold coupon notes | | \$4,000,000 | \$5,000,000 |
| Accounts payable | | 1,318,111 | 4,516,740 |
| Accrued interest | | 85,896 | 98,604 |
| Unclaimed interest | | 9,600 | 2,238 |
| Dividend on preferred stock, payable July .. | | 437,500 | 437,500 |
| Dividend on common stock, payable August .. | | 312,500 | 312,500 |
| | | \$6,163,607 | \$10,367,582 |

The income account for the fiscal year ended June 30, 1908, as compared with that of the previous year, is as follows:

| | 1907-8. | 1906-7. |
|--|--------------|--------------|
| Gross earnings | \$37,484,417 | \$49,515,486 |
| M't'g., maintenance and administrative exp. .. | 32,497,627 | 42,744,381 |
| Net earnings | \$4,986,790 | \$6,771,105 |
| Interest, etc., on bonds of constituent companies, coupon notes, etc. | 460,042 | 412,898 |
| Profit | \$4,526,748 | \$6,358,207 |
| Dividend on preferred stock at 7 per cent. | 1,750,000 | 1,750,000 |
| Dividend on common stock at 5 per cent. | 1,250,000 | 1,250,000 |
| Surplus | \$1,526,748 | \$3,358,207 |
| Extraordinary additions and betterment fund. .... | ..... | 2,000,000 |
| Reserve for replacements and maintenance. | 500,000 | ..... |
| Net credit to profit and loss | \$1,026,748 | \$1,358,207 |

NEW PUBLICATIONS.

The Six-Chord Spiral. By J. R. Stephens. New York: *The Engineering News Publishing Co.* 68 pages; 5 in. x 7½ in.; 6 illustrations. Price, cloth, \$1.25; boards, \$1.00.

The book is a brief explanation of and an argument in favor of the use of the six-chord spiral in track location, instead of the track parabola or the polychord spiral. The advantage of the method lies in the fact that it is an ordinary multi-form compound curve of six arcs of equal length, whose degrees of curvature increase in the order of the natural numbers, and are so arranged that the seventh arc always exactly coincides with the main circular curve. It is a method that is being somewhat extensively used, with results, as far as ease of movement is concerned, fully equal to the true parabola. Having stated the case and outlined the method of application, numerous examples are given in practical demonstration. These demonstrations include that of the formula for substituting spirals between two curves by shifting the position of the original tangent, the connection between compound curves and calculations of various conditions that may arise. The work is clear as far as each solution is concerned, but is wanting in that it deals with specific instances rather than with the principles upon which those instances are based. That the six-chord spiral is a rapid and convenient method of layout curve approaches there is no doubt, and with the general principles learned this book will afford a convenient reference and suggestion as to the exact methods to be followed in solving special cases, for the whole is easily grasped and requires only elementary mathematical treatment.

The Confessions of a Railroad Signalman. By James O. Fagan. 181 pages; 4¼ x 7¾ in.; illustrated with eight photographs of typical wrecks. Houghton, Mifflin Co., Boston and New York; 1908. Cloth. Price, \$1.00.

Mr. Fagan's book is entirely unique in its field, and we believe that it is going to accomplish a great deal of good. The author himself has had a most interesting and unusual experience. Born in Scotland 50 years ago, he studied in England, was apprenticed to a cable laying expedition which took him from Portugal and the Canary Islands to Rio de Janeiro; then worked for several years in South America as a cable operator. Mr. Fagan then caught the gold fever and went to South Africa, where he was engaged principally in trading. After the battle of Majuba Hill, he went to the United States, and, arriving in Boston in the spring of 1881, he secured a job on the Boston & Lowell. After a few months he went to East Deerfield, Mass., on the Fitchburg Railroad, where he worked nights for five years. From there he went to the signal tower at Cambridge, where he has now been located for 22 years, during which time he has made a very unusual study of the sociological side of railroading. The book at hand is composed principally of papers which he has contributed to the *Atlantic Monthly*. These papers attracted the attention of President Roosevelt, who sent for Mr. Fagan to have a talk with him; and also of President Eliot, of Harvard, who asked Mr. Fagan to lecture this winter at the new Harvard Graduate School of Business Administration.

The book is well written and is entirely fearless in its expression of what the author believes to be the real trouble in American railroad organization to-day. The principal lesson of the book is well summed up in Mr. Fagan's statement that "In every day life when a man fails to make a satisfactory score with a first-class gun, we do not place the blame on the weapon. If we desire greater efficiency in marksmanship, we direct our attention to the man. But in the railroad business such commonplace logic does not seem to apply. When a man violates an unmistakable rule or runs a signal with disastrous results, there immediately arises on all sides a peremptory demand for a different kind of rule, or an improved signal. * * * In some way we have got it into our heads," says Mr. Fagan, speaking for the whole body of railroad employees, "that rules are permissive, not positive. This principle means the exercise of our own judg-

ment according to the circumstances, regardless of the rule."

The author believes that in all things that pertain to material well-being American railroad men compare more than favorably with any other class of workers in the country, but that, considered as responsible individuals, entrusted with the care of railroad property and the safety of the traveling public, their records are very unsatisfactory. Moreover, when an accident occurs there are always people to be shielded. The labor organizations are strong and have at hand a very complex set of railroad-management-formulated rules, on which they can fall back in making a legal or semi-legal defense of an engineman who causes a wreck. Moreover, the superintendent has by no means a free hand in weeding out the men that he believes are going to cause wrecks, before the wrecks take place. When discipline is administered, it does not always have a helpful effect in preventing similar accidents another time. Neither in the interest of public safety nor for any other reason can the full facts in the case be published for the prevention of future accidents of a similar nature. "We consider discipline to be a private matter, to be settled between ourselves and the management, and thus the workings of the system have been arranged without any reference whatever to its effects on the interests of the millions of people whose lives are placed in jeopardy."

Mr. Fagan by no means condemns railroad labor organization as such. He believes that the debt which railroad men owe to their organizations admits of no question, and that the beneficial results are before them in almost every department of the railroad business. The organizations have advanced wages and they have been particularly active in inciting legislation for the protection of life and limb among workers, but unfortunately the influence of railroad labor organizations has been consistently exercised to nullify discipline, to destroy personal management and authority and to obliterate from schedules and working agreements reference to or consideration for the paramount interests of the traveling public.

The author believes that the whole system of railroad records is incomplete when it comes to records dealing with the workmanship and character of different men, and of the value and significance of the human element in running a railroad. "If a certain train crew runs a freight train 200 times a year, breaking 70 drawbars and upon different occasions delaying 37 passenger trains, and another crew, under very similar conditions, pulls out only 13 drawbars and delays only nine passenger trains, you may consider the records quite important; but in the railroad offices you will find no statistics of this nature."

Mr. Fagan says that "in the mental composition of the American railroad man there is no such idea or faculty as dogged obedience;" a quality which he considers to be an indispensable ingredient in producing safety in railroad travel. He says that just as soon as the government of the United States sees fit to designate carelessness on a railroad as a crime, punishable in the same way as carelessness in driving horses or automobiles on a crowded thoroughfare, a revolution will take place in railroad service. "When the management and the men are called upon to face public assertion and public criticism there will be no more hair splitting in the interpretation and administration of justice."

Nobody can read Mr. Fagan's very interesting book without being convinced that he has at least measurably explained why American railroad travel is dangerous. The book is open to the objection that while it outlines its case clearly enough, it offers no remedy that sounds at all helpful. It is not a simple matter, however, to lay down rules for the correction of a national tendency—the tendency to take chances, and to hold that the man is bigger than the rule. But before any important attempt is made at producing remedies, it is of the highest importance that the facts be seen straight. The great value of Mr. Fagan's book lies in the straightforward manner in which he sees facts and reports them. It ought to have great possibilities of usefulness, and we are

inclined to think that the distribution of blocks of these books to division superintendents for use in their territory would well repay the small cost.

Letters to the Editor.

PRIVATE CARS.

Pittsburgh, Pa., October 6, 1908.

TO THE EDITOR OF THE RAILROAD-AGE GAZETTE:

In your issue of October 2, you have an editorial on a recent ruling of the Interstate Commerce Commission relative to demurrage charges not being charged when private cars are placed on a privately owned switch. The general tenor of this article is so manifestly unfair toward the owners of private cars that sufficient space in your columns is desired in order that the question as viewed from their standpoint may be answered.

Primarily, the owner of a private car has become so because the railroads were not able, or were unwilling, to furnish him with a sufficient number of cars with which to ship enough of his product to meet the requirements of his customers. The arguments you use in your editorial are the same as those of a competitor having the same facilities as his successful rival, but lacking the natural qualities that win in any department of trade. His foresight is not equal to his necessities, and because the private car owner has taken advantage of the situation at the proper time there are always those who assume he has thus acquired an undue advantage over those not owning their own equipment for use in shipping their product. There never has been a time, is not now, nor will the future bring to light a condition when the law of the "survival of the fittest" will not govern.

It is a question at this time, and has been for some few years past, whether a private car is a source of revenue to its owner or a constant bill of expense. Under present conditions the private car is not a paying investment, and for the last few years they cost more than they earn. This is due to a variety of causes, and among these may be given the following:

1. Low rate paid as mileage earnings.
2. Use of private cars by railroad lines for their own uses, and to the exclusion of their use by their owners.
3. Excessive car repair bills, due to rough usage by railroad train crews, and a constantly increasing bill of expense as they grow older and the repair bills grow larger, and which, according to the rules of the Master Car Builders' Association, the private car owner must pay, even though often unjust.

The writer within a few days received a letter from a western firm which received some new tank cars, never used, having broken parts, and with the cars received car repair bills for repairing the damage done. The rules of the M. C. B. Association make the owner of the car responsible for such damage as was done, and the firm was obliged to pay the bill as presented. It is doubtful if there is a similar case on record of such a character in any other business where protection of property rights is not accorded the owner of the property. In the case of the private car owner *versus* the railroad, it is simply one of might making right to the advantage of the railroad.

On the question of demurrage on private cars when on railroad sidings, you say nothing. The expense of such detention is one that the private car owner must bear. His property is tied up, and the railroad secures the revenue. When not moving the car earns nothing for its owner. Who ever heard, however, of a private car owner ever having been paid any part of the demurrage charges collected on private cars by any car service association when the shipment was made by a private car owner to one of his customers, and the car was loaded with the product of the car owner and in one of his own cars?

The railroads, as a whole, refuse to furnish tank cars either

for general trade or to oil producers or refiners of oil. In the case of one road, at present owning the only equipment of this kind, the management states that when worn out it will not be renewed. There are other lines of business where special private equipment is a necessity in order to successfully carry on that business. How then could the Interstate Commerce Commission lawfully say to the shippers of any other commodity, "You must not own your own cars," and on the other hand, how can they say to the railroads, "You must buy all private cars," when to do so involves an expenditure of over \$200,000,000?

In a statement made by the writer to an association of railroad officers recently, statistics were presented on the earnings and cost as furnished by the owners of private tank, coal and coke cars, there being five tank car owners, four coal car owners and one owner of coke cars. In this statement the figures due to depreciated value of the car were not given. On one side the mileage earnings of these ten private car owners was given, showing a yearly average per car of \$49.25. On the other side were the car repair bills, plus yearly interest of six per cent. on the actual money invested, and the result was \$97.75 as the average annual cost per car. These figures were for the year ending the early part of 1908, which was a good average year; the net loss per car being \$48.50.

Under such conditions as are here given, what private car owner would willingly ship his product in his own car, knowing it would be held for an indefinite period by one of his customers, when he could make shipment, perhaps prompt or otherwise, in a car owned by a railroad line? It is safe to assume that one shipment to a customer, under such conditions as mentioned in your editorial would be sufficient.

As a leader in its particular field, the writer fully recognizes the power for good or evil in an editorial of the *Railroad Age Gazette*. For this reason we have thus called your attention to what we believe an erroneous and unjust expression of opinion on a subject with which you have not as yet been as fully and completely informed as you might be. You have raised in your own mind a man of straw whom the first strong breeze is likely to blow to pieces.

To the owner of any private car, whether such owner is a large or small shipper of such product as he produces or deals in, there is no such advantage apparent to him, as your editorial would lead your readers to believe.

ROBERT J. BAILEY,

Secretary, Individual Car Owners' Association of the United States.

Contributed Papers.

AUTOMATIC "LIGHT" SIGNALS IN PARK AVENUE TUNNEL.

The Park avenue tunnel of the New York Central & Hudson River, comprising two miles of the four-track approach to the Grand Central Station, New York City, has just been equipped with automatic block signals (in place of manual), and they give their indications, both night and day, by the colors of the lights, and therefore have no moving parts. In principle these signals are similar to those in use on the Brooklyn bridge, recently described in these columns. The New York Central signals are made by the General Railway Signal Company, Rochester, N. Y.

This four-track line has been worked by block signals for 25 years or more, and since about 1883 by the "lock and block," or controlled manual system. This line was, we believe, the scene of the first installation of Sykes' control apparatus in this country. Later the apparatus was reconstructed, the Union Switch & Signal Company introducing its most elaborate improvements, this to meet the complaints that the signals were sometimes hard to find, on account of the smoke in the tunnel. Duplicate lamps were put in at all

of the signaling points, so that both the engineman and the fireman, each on his own side, could have the best possible view of each signal. The old signals consisted of lamps turning on vertical spindles, like a pot signal. In the tunnel automatic torpedo-placers have been used for several years in connection with the signals, and large gongs, fixed to the tunnel walls, have also been in use. Since the last complaints about difficulty in seeing the signals, an overlap has

is divided into nine block sections. Under the former arrangement there were only three. Each signal is controlled by the track circuit of its section and an overlap the full length of the next section. The new signals are two-position—or, more strictly, two-indication—home and distant, red indicating stop; yellow, caution, and green, clear. In a few cases (as in Fig. 5), where the track is not straight, duplicate signals are provided, the same as under the old arrangement, one on the right of the track and one on the left.



Fig. 1—Signal 172, Track No. 2; Seventy-fifth Street.

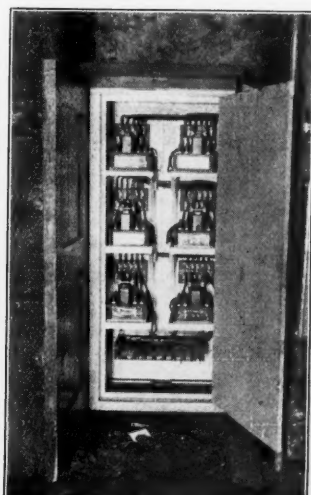


Fig. 3—Relay Box at Signal 211.

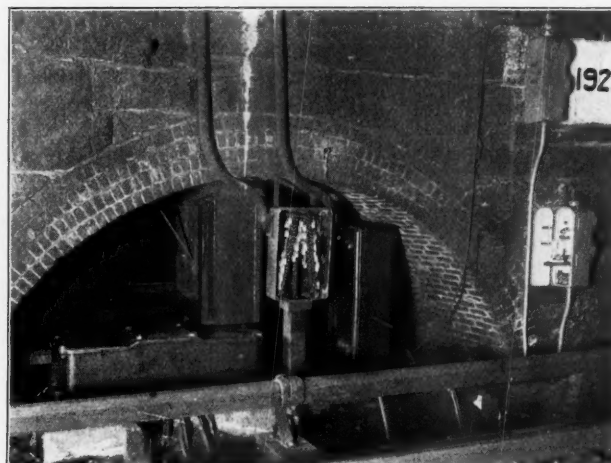


Fig. 2—Signal 192; Eightieth Street.

been provided at the beginning of each block, most of the overlaps being about 800 ft. long.

The abandonment of these former safeguards and the introduction of the simpler signals has followed the introduction of electric motive power, doing away with all trouble from smoke in the tunnel. The signals are now worked under the usual automatic signaling rules, and the section of about two miles

Power for the operation of all track circuits, signals and relays is taken from the 2,200-volt, 25-cycle, single-phase power line, and is stepped down to 50 volts through suitable oil-cooled line transformers (L. T., Fig. 7). One line transformer serves all the signals, etc., for the four tracks at a given location through a pair of 50-volt local mains.

Current for operating the track circuits and relay local windings is supplied through suitable track transformers (T. T.), one for each track circuit. The track winding on these transformers is provided with taps for the adjustment of the track voltage to suit sections of varying length. Grid resistances (G. R.) are employed to prevent an excess current flowing from the transformer when a train is at or near the location in question. The reactance bonds (B.) permit the passage of the traction current from section to section, and at the same time offer a resistance to the passage of the alternating signal current from rail to rail. These bonds have a continuous current capacity of about 5,000 amperes per track, with a momentary capacity of 10,000 amperes, or more.

The track relays (T. R.) have two windings, one fed from the track circuit and called the "track winding," and one from the transformer called the "local winding." The bulk of the energy for operating the relay is fed to the local winding, only a small amount being delivered through the track circuit. These relays are immune to the effects of the traction current.

Secondary track relays (S. T.) are employed for the direct control of the various line circuits, and in turn are operated by, and in unison with, the track relays (T. R.), as shown. While the track relays have sufficient power to operate four or more contacts and to control the lines direct, the secondary relays are used to maintain uniformity of construction over the entire electric system. The Home and Distant line relays are of the same construction as the secondary relays, i. e., of the tractive alternating current type. Fuses of suitable capacity as shown are employed to isolate trouble. The devices thus far described will be found fully illustrated and further described in the Signal Dictionary.

These signals were developed to meet the requirements of this tunnel, in which there are a number of "daylight" locations; and in order to have the indications sufficiently distinct in such locations, $7\frac{3}{4}$ -in. lenses with 16-candle-power lamps, are used. To dissipate the heat developed by the 16-candle-

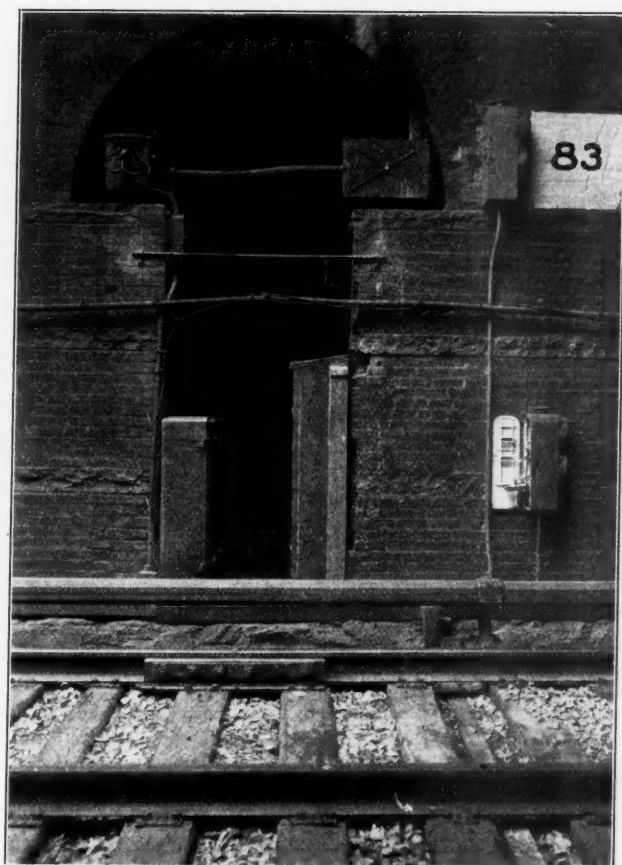


Fig. 4—Signal 83, at Fifty-ninth Street.

power lamps, burning two in multiple, and at the same time to keep the two light compartments absolutely separate, so as to prevent leakage of light from one to the other, each compartment is independently ventilated as shown. For the lower compartment the air passes in at A, up through holes in the lower shelf and out at C. For the upper compartment the air passes in at D and out at E. All ventilating openings are so made as to prevent the entrance of rain or dripping water. The ventilators (C and D) in the door project inward to keep the front of the door flush so that it can be opened as wide as possible. This is necessary on account of the close clearances and hence the necessity of fixing the signals near to the wall. The lamps are mounted in double porcelain sockets with self-contained fuses, the whole being



Fig. 5—Signal 194, Track No. 4, Eightieth Street.

mounted on a wooden block. The block is held in grooves in such a way that the block with lamps, fuses and all, can be removed bodily for inspection without disconnecting any wires.

All local wiring in the signal is connected to a slate terminal board at the bottom, as shown, to which all incoming wires may be attached. The two lenses, with their lights which take the place of one signal arm, are fitted in a separate case, i.e., one case is used for the home and a separate case for the distant signal. The distant signals, like the old distant signals, are fixed from 30 in. to 48 in. above the level of the rail.

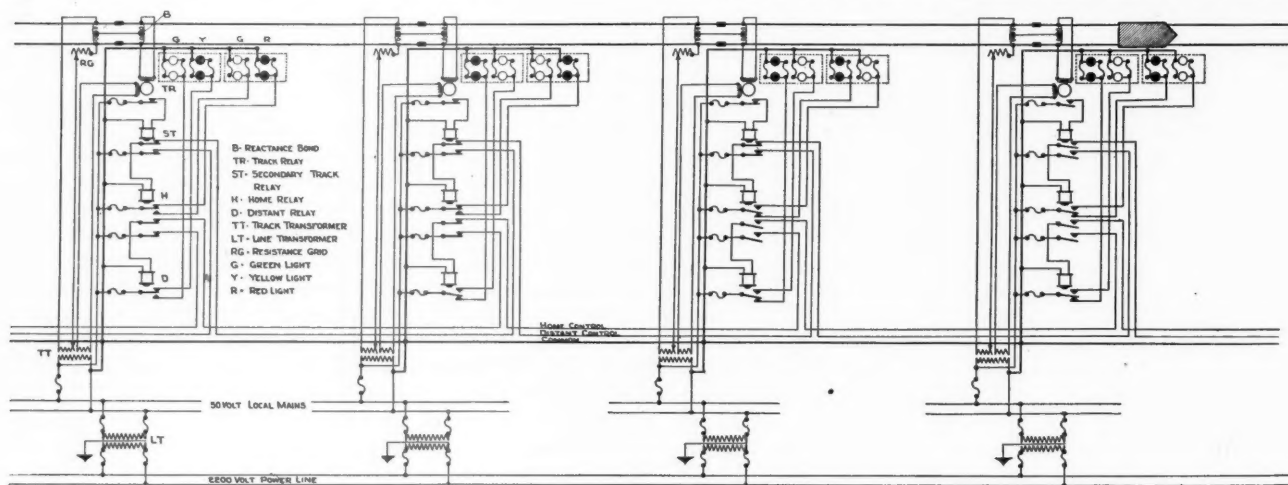


Fig. 7—Wiring for Automatic Block Signals, Park Avenue Tunnel, New York.

The legends "Home Control" and "Distant Control" should be transposed.

Hoods G and G may be used, if necessary, in very light locations, but in this tunnel all signals are shaded, at least by a street bridge 60 ft. wide, and no hoods are used.

Of the illustrations, Fig. 1 is given to show one of the distant signals which, in consequence of the limited clearance in the tunnel, has to be placed with its top only about 30 in.

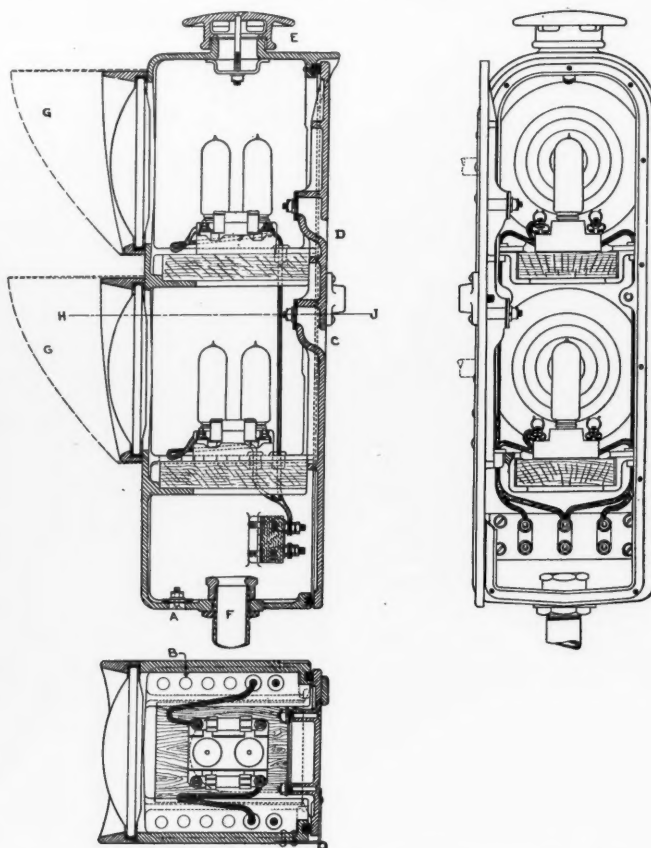


Fig. 6—Electric Light Signal for Park Avenue Tunnel.

NOTE.—By an error in lettering the drawing the letters G and Y for the distant signal, and G and R for the home, have been transposed. The shaded circles represent the lights that are burning, and those shaded circles which are lettered represent green lights, not red and yellow.

above the level of the rail. The photograph was taken before the signals were put into service and before the lower opening in the distant signal had been fitted with its lens. For some days before the signals were put in service, this lower light, uncolored, was kept burning to enable the enginemen and trainmen to familiarize themselves with the locations of the signals.

Fig. 2 shows the back sides of two signals, the home signal

box being closed and the distant signal open. To the left of the signals in the picture are: first, a box containing the track relays and transformers; next the junction box (open), and, lastly, resting on masonry foundations, the reactance bond of the track circuits. Fig. 3 shows a relay box set into the wall of the tunnel; at the right is the inside door and at the left the outside. Throughout the tunnel the space available for the fixtures is extremely limited and Fig. 4 shows another arrangement of the boxes, where room is scarce. Fixed to the left of the signal, on a level with the home signal, is the fuse box; below this is the relay box, to the left of which are transformers—two boxes on the ground and one on the wall above.

Fig. 5 shows the appearance of the signals in one of the side tunnels, as seen from an approaching train. The upper signals, somewhat higher than the level of the eye of the engineman, give the home indication, and the lower signal the distant indications. In each signal the upper lens is green and the proceed indication is given by energizing the light behind this glass. The stop indication is given by energizing the light behind the red lenses, which are the lower ones in the upper signals. The caution (distant) indication is given by illuminating the yellow (lower) lens in the lower signal. The details of the lamp are shown in Fig. 6, and the wiring is shown in Fig. 7.

The line through this tunnel consists of four main tracks. The two outer tracks are each in a single-track tunnel, while the two inner tracks are in a two-track tunnel. For a large part of the two miles, the roof of the tunnel is artificial and over the inner tracks there are openings 100 ft. long or longer, and about 15 ft. wide. The signals, however, are shaded, as before mentioned.

A TEXAS VIEW OF RAILROAD REGULATION IN TEXAS.

The *Railroad Age Gazette*, July 31, published an editorial entitled "The Fruits of Drastic Railroad Regulation in Texas." If any reader thought that the criticisms of the Texas Railroad Commission made in that editorial were too severe or that the view taken of the railroad situation in the Lone Star state was too pessimistic, he should read in full the following editorial from a recent issue of the *Beaumont (Tex.) Daily Journal*, which describes the situation as a Texas newspaper sees it:

"On August 10, after a period of many years during which the course of interstate railroad rates has been steadily downward, an increase of about 10 per cent. (to Texas points) became effective.

"So significant an event in the economic history of this state is entitled to careful consideration by organs which aspire to aid public opinion to attain just conceptions of current events. We have given the matter careful study so far as Texas railroads are concerned, and the following presentation of the facts is based on reports and records available to every student of such problems.

"In the spring of 1905 Texas had at last emerged out of the depressions which had been so severely felt during the first half of the previous decade, during which a number of its railroads had been in the hands of receivers. The times were improving from year to year, and while the Texas railroads had accumulated during their days of trouble on account of the operations of previous years an aggregate deficit of \$19,481,000, yet their income for the last several years had steadily improved, and the owners of those properties began to draw long sighs of relief, believing that the future, which appeared so bright for all lines of business, contained the prospect of real prosperity for the railroads also, and real prosperity to the owners of a railroad in Texas, whether built before or after the passage of the stock and bond law, is realized if the railroad income suffices to pay interest on outstanding bonds and 5 per cent. on outstanding stock. The

aggregate railroad income for the fiscal year which ended June 30, 1905, represented 4 per cent. on the amount of stocks and bonds which were at that time (12 years after the passage of the stock and bond law) outstanding.

"The average amount of stocks and bonds per mile of railroad so constituting legal and valid obligations against the various railroads, outstanding at that time, was \$34,822 per mile, which was much below the average for the United States, and a minor fraction of the average for the various countries of Europe.

"At that time there were 11,744 miles of main track in the state, which the railroad companies in their sworn reports stated had cost \$454,543,869 to build and equip. Two thousand six hundred and fifty-six miles of this total, or about 23 per cent. of same, had been built subsequent to June 30, 1893, and the stocks and bonds outstanding against the same bore the approval of the railroad commission. The amount of interest-bearing securities which had been issued, under the supervision of the commission mostly against new mileage and which was then outstanding, was \$32,733,000. Some of these obligations carried 4 per cent. interest, some 5 per cent., and many millions carried 6 per cent., which is the maximum rate allowed by law on railroad bonds.

"The total amount of stocks and bonds outstanding at that time was \$389,736,027, of which amount approximately \$357,000,000 had been issued against the 9,088 miles built during the half century preceding the year 1893. The railroad commission had always contended these issues were greater than the value of the properties; the railroads contended to the contrary, and as above stated, declared in 1905 that whereas the aggregate of all their securities outstanding was \$389,736,027, their properties had actually cost over \$450,000,000. The railroad commission would admit, however, a value on the same properties of only \$183,063,708.

"As to which value was the nearer correct, it is pertinent here to refer to the fact that to-day the railroad commission only allows a value of \$200,000,000 on the railroads of Texas, whereas the state tax board on oath values them in excess of \$420,000,000, which largely exceeds the aggregate amount of their stocks and bonds.

"At this time the railroad commission had been organized for about 14 years, they had from time to time effected sweeping reductions in rates, their orders had been contested through the courts, modifications and adjustments had been effected, and the state and the railroads had settled down to a long joint pull on the up-grade toward better relations and better times between all and for all. It was understood from the decision of the United States Supreme Court that the railroad commission was a constitutional body, and acting in the interest of shippers and travelers, had the right to so fix and maintain tariffs that the railroads in general should earn on an average merely a reasonable return on the value of their properties.

"There were and of course still are outstanding two points of difference between the railroad commission and the railroads which then caused and until settled, will continue to cause deep and endless trouble, namely, as to what rate per cent. constitutes a reasonable return, and as to the value of the railroads' properties.

"With these two questions in suspense, however, and after a number of lean years under reduced tariffs promulgated by the commission in the nineties, the increased volume of traffic in Texas gradually improving from year to year, particularly of cotton and lumber, on which Texas railroads obtained long hauls, began to produce increased revenues, the clouds began to lift and a period of prosperity seemed about to dawn in 1905 for the Texas railroads. But in March of that year there came, like a bolt of lightning out of a clear sky, notice from the commission to all the railroads that it proposed to reduce the rate on the great staple, cotton, 5 cents per 100 lbs. The hearing was held March 21. It meant the loss of mil-

lions of dollars in revenue to the railroads. Many still recall the heated arguments between the railroad representatives and the commission. The commission was implored to let the rates alone for a while longer; the net revenue when results for that year appeared, was found to represent only 4 per cent. on the railroads' securities outstanding, and only 8.45 per cent. on the railroad commission's inadequate valuation. It was urged to the commission that no one could predict how long good times would last, and that the rates as they then applied to the volume of traffic moving, did not enable the railroad companies to lay by one penny in the way of surplus, to provide either for the betterments of the properties or against hard times. Their arguments were overruled and the rate was reduced.

"At that time B. F. Yoakum had just gotten under way his immense plans to build lines of railroad entirely across the state in two directions. The revenues to accrue from the main commodity on his central Texas line were thus cut about 10 per cent. of the gross and probably 35 per cent. of the net, before he had gotten his new construction well started.

"But 1906 and 1907 proved to be extra good crop years. The amount of tonnage offering for transportation grew by leaps and bounds and of course gross revenues of the railroads increased to correspond, and the increase of the rate per cent. of income was favorable, being, in 1906, 4.77 per cent. on the outstanding stocks and bonds, and in 1907, the best year in the history of Texas railroads, 6.3 per cent. on the outstanding stocks and bonds.

"Of course, no such income was actually paid to the holders of stocks and bonds because from income must first be deducted all taxes payable to city, county and state governments, amounting in 1907, to \$2,102,485, or to about 8 per cent. of the income; and of course, also out of income having no surplus, it was necessary for the railroads to spend large sums to improve their properties. So, after making such prudent disposition of this earned money as appeared advisable and first paying interest on bonds, the railroads of Texas, in regard to the best year in their history, after paying out only \$287,789 in dividends on capital stock, had in hand an earned surplus on account of the business of the year, \$4,841,284. They still were carrying from previous years, however, a deficit; and after the application of the entire earned surplus for 1907, still had a deficit of \$5,147,964, with which they turned to face the panic year of 1907-8.

"In 1906, soon after construction had been gotten well under way on the new Yoakum line between Houston and Beaumont, whose principal tonnage is lumber, the commission cut the lumber rates. Again the railroads went over the same ground with the commission as in the cotton hearing, urging that while they were in fact still slowly increasing the rate per cent. of their incomes, they had no sufficient assurance for the future and absolutely no margin of income to provide against a rainy day. From time to time reductions were made in other individual rates, and at last in 1906, all of the important roads joined in suits to set aside all the commission's rates. In 1907, however, the last blow seemed about to fall. The commission proposed to reduce the revenues from the passenger service 33 1/3 per cent. The panic was already on at that time, and for several months each month's results to the railroads had been worse than that preceding. The cotton crop then moving was 1,600,000 bales, or 35 per cent. short of the previous year, and the grain crop even shorter. At this moment the justice of the commission asserted itself and the proposition to reduce the passenger rates was dismissed. The railroads felt like one reprieved from capital execution. They at once voluntarily dismissed the rate suits they had previously filed.

"Just prior to this, however, in the spring of 1907, the legislature had gotten action. In 1906, here at Beaumont, in the Democratic county convention it was moved that the old so-called Hogg amendments be made a Democratic platform de-

mand. When challenged to state what those amendments were, the proponent could not recall, but nevertheless wanted them in the platform. They were, in fact, afterwards inserted in the state Democratic platform, and in 1907, the legislature of Texas in obedience to same, passed among other laws, a law providing that if at any time a corporation become insolvent (that is, unable to pay any debt when it matures) it shall suffer death, that is, forfeiture of its charter, at the suit of the state.

"In the fall of 1907 the railroad commission ordered the railroads of the state to finance the purchase of about \$45,000,000 of new equipment. As above stated, they were then in deficit.

"Such were the several conditions before the minds of railroad managers in Texas, when they turned to face the year 1908.

"The results for the first 11 months of the fiscal year ending June 30, 1908, on 23 of the most important lines are now available. What do they show?

"The gross revenues, compared with the previous year, have fallen off \$10,574,914.

"Operating expenses instead of decreasing in proportion to the decrease in gross revenues, as is ordinarily the case, increased \$740,160.

"Income fell off with such a slump that instead of having an amount \$6,451,338 in excess of fixed charges, as was the case last year, the fixed charges against income on May 31, 1908, exceeded income \$8,430,572.

"This is the rainy day about which the railroads talked to the commission in 1905, and again in 1906, when the rates were reduced on cotton and lumber.

"Let this statement be understood. The principal railroads of Texas in 1907-08 failed to earn enough money by more than \$8,430,572 to pay their honest debts.

"If we are able to comprehend the plain language of the act of the thirtieth legislature, this fact brings them under the shadow of death.

"(There is not a railroad general manager in Texas who reads these lines, but will wince and possibly utter deep and profane words under his breath when he sees this statement in public print. He is walking the floor at night on this very account, and reporting the facts monthly to the railroad commission, but dreads for the world to know the real situation. We print it, first, because it is true; second, because the market for Texas railroad stocks and bonds has been dead for 15 years, and nothing now can do it any further harm; third, because the people of Texas are a fair people, but their sense of fairness can never be made operative until they learn the facts.)

"Here, then, is the strangest situation in economics ever known in the history of the world. No other business on earth could be conducted on the same principles without coming to grief at once:

"First, it is made a capital offense for the railroads to become unable to pay their debts, which includes interest on bonds; second, the power to fix the rates which produce their income is absolutely taken out of their hands as to the Texas rates and those rates are constantly reduced; third, the railroad commission and the legislature have the power to order and have ordered them under heavy penalties to buy \$45,000,000 worth of engines and cars; to spend millions improving track; to pay heavier taxes by an extra million or two; to buy electric headlights; to reduce the time of train men, creating new divisions and division staffs; all of which, with other orders, many of which were protested by the railroads, have greatly increased their obligations, and shoved them along toward the dead-line where the insolvent corporation law lies in wait for them.

"But one or the other of two avenues of escape appears to open to the Texas railroads: To increase the interstate rates over which they still have the power of initiative; or to reduce

the wages of employees, which constitute 40 per cent. of the expense of operation.

"They have decided to increase some of the interstate rates, on an approximate average of 10 per cent. It means a difference of less than 10 cents on \$40 suits of clothes shipped from St. Louis to Beaumont, to the shipper; but it may constitute the difference between life and death to the railroad companies of Texas.

"But a vigorous effort is being made to stop up this avenue of escape. The railroad commission obtained the consent of the Governor of Texas, and the aid of the Attorney-General, and the aid of one of our United States Senators, and proceeded to Washington to protest the proposed increase. All the powerful machinery of our state government was therefore brought to bear. According to the newspaper reports, the Chairman of the Commission filed with the Interstate Commerce Commission at Washington a statement contrasting the earnings and expenses of 1891, a period of depression, with the figures for the year ending June 30, 1907, which as above stated, was the best in the history of Texas railroads, when they earned almost 6 per cent. on the amount of their stocks and bonds. But it appears he was utterly silent as to the figures and circumstances for the year ending June 30, 1908, above referred to, which created the conditions which are forcing the raise of interstate rates.

"Suppose the interstate rates are not increased, will the Texas commission increase the purely intrastate rates? Every one knows it will not. Will the employees agree to accept less wages? Every one knows they will not. Any effort to reduce wages would probably bring on a general strike. Will the commission cancel the orders to buy more equipment or improve the tracks? They have declared they will not. Will the state remove some of the new burdens of taxation? Every one knows it will not. Will our public functionaries persuade the lawful holders of our outstanding bonds to waive the payment of current interest? They cannot. Will they request the legislature to repeal the insolvent corporation law? Every one knows they will not.

"Then, what can possibly be expected in regard to the fate of the Texas railroads? The situation is so acute and dangerous as to be almost laughable. At the beginning of the present period of depression the writer saw one of the oldest and most honored of the railroad officers in Texas sitting before the railroad commission of Texas, giving testimony, with tears in his eyes. The fears he expressed at that time did not cover the actual conditions obtaining now.

"We see statements in other periodicals condemning the proposition to increase the interstate rates, saying that everybody has suffered during the late depression, and that the railroads should stand their part of the general losses; also, predicting a recovery of business and the movement of a heavy traffic this fall. The reply is that a deficit may mean death to a railroad which has been compelled to do business year after year on rates so thin it has no surplus to keep it out of the red; not so with the shipper. He has no limitation on his prices except competition, and if a prudent man has charged such prices in good times that he has laid away a fund to carry him through hard times; and if necessary, can increase his prices when good times come again to make up for previous losses without let or hindrance.

"Moreover, if railroad rates are not compensatory, do not contain a sufficient margin of profit, what comfort can there be in the prospect of a big business? It is believed by good traffic men that some commodities in Texas are under existing rates, transported at an actual loss. On such traffic, the more business done, the greater is the loss. Since the passage of the law referred to by the last legislature in our judgment Texas railroad companies will not only be justified, but absolutely compelled to bring all of their rates up to a point where a margin of safety will at all times exist to remove the dread of deficits, and we believe the courts will sustain them."

PROGRESS ON THE ST. PAUL'S PACIFIC EXTENSION.

Construction work on the western end of the St. Paul's Pacific extension—that is, from Butte, Mont., to Seattle, Wash.—is nearly finished on some divisions, but the big tunnels and certain heavy fills will yet take some time. Rails are now laid in five different sections, but are not continuous for more than 120 miles. On the Seattle-Tacoma line, track has been finished from Black River Junction south 17 miles to Sumner, Wash., paralleling the Seattle-Tacoma Interurban through Kent and Auburn, and crossing the Puyallup river just above the Interurban bridge.

Starting from Seattle, the main line is completed to a point five miles east of Maple river, 75 miles. The heaviest work of the entire extension is through the Cascade mountains from the Black river to Easton, which includes the big tunnel under Snoqualmie Pass. Work on this tunnel is very slow, but progress is satisfactory, and every effort will be made to get it finished on time. Between the Black river and the tunnel is one of the least advanced sections. This division has many heavy 60 to 70 ft. cuts and fills, on which work is only fairly started. The cost of this section will easily average \$75,000 a mile.

From a point three miles east of the Cascade summit at Snoqualmie Pass to a point 13 miles east of Ellensburg, in Kittitas county, Wash., is a 67-mile stretch of completed line. Then follows a gap of about 20 miles of uncompleted line extending to Beverly, on the Columbia river. Beyond Beverly, east to Rock lake, Whitman county, Wash., 119 miles of road is finished. On this section, between Snoqualmie Pass and Rock lake, except for the part between Beverly and Ellensburg, the bridges are in place, tracks and side tracks are laid, and some surfacing has been done. The 15-span bridge over the Columbia river is being built. The piers and approaches are in place, the steel for the superstructure is on the ground, and erection will begin by October 15. It is expected that the bridge will be ready for traffic by March, 1909.

Between Rock lake and Plummer, about 50 miles, is the second long stretch of uncompleted line. Grading in this district is now in progress and is being pushed with all possible speed. The line from Plummer, just across the line in Idaho, to within 15 miles of St. Paul Pass tunnel in the Bitter Root mountains, has 75 miles of track laid. On this division, commonly called the St. Joe division, the grading is all done and the bridges are completed. A majority of the side tracks are laid, while work on the stations, freight warehouses and switch yards is being pushed rapidly. Nearly all of the ballasting will be finished this fall. A number of small streams are spanned by temporary wooden bridges. Permanent steel bridges are being erected as fast as the steel can be brought from the East. At present, the St. Paul crosses a branch of the Spokane river at Tekoa on the 900-ft. bridge of the Oregon Railroad & Navigation Co. On this division about 90 per cent. of the work is done.

The last of the completed sections extends from St. Paul Pass tunnel to Butte. However, about 100 miles of this grade in Hell Gate canyon, between Butte and Missoula, was washed out last June and has not been rebuilt. From Missoula to St. Paul Pass tunnel, 85 miles, grading is finished and the track laid. On the eastern end of the line, passenger service through to Butte has just been begun. Freight service to Butte has been in operation for some time.

Terminal work at Seattle is barely started, a great deal of filling being necessary before work on building foundations or switch yards can be begun. This will have to be pushed vigorously to be ready for the opening of the line. At Tacoma, work on extensive terminals on the tide flats in Commencement bay is under way. The piling for the docks is about all in place and work on the bulkheads has begun. Two siphon dredges are working on the channel, which is to be deep enough to accommodate the largest ocean vessels.

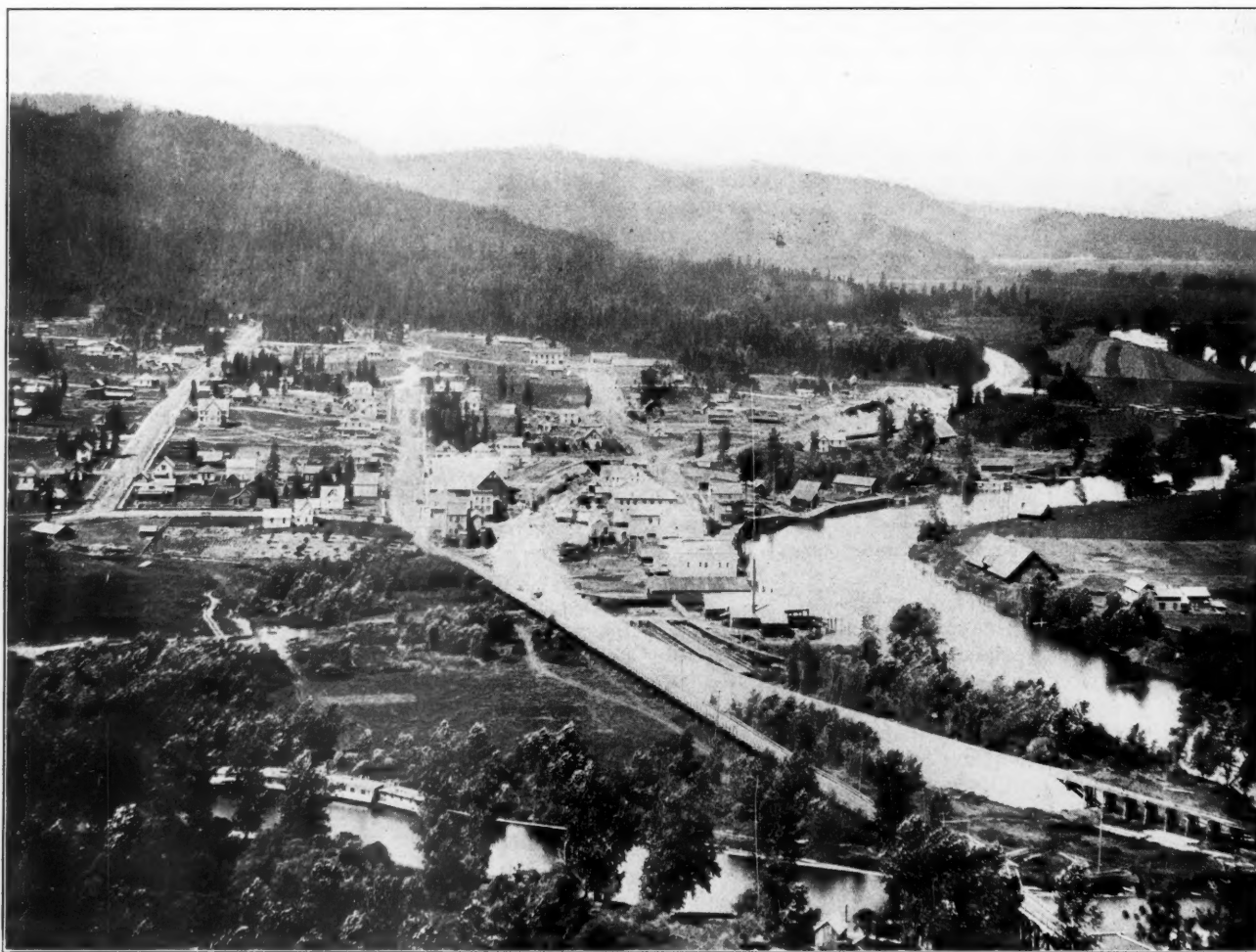
Several branch lines have been located, this being about all that has been done in this direction. One branch that will be very essential is located from St. Maries, Idaho, southward up the St. Mary's river into the rich Palouse wheat country of southeastern Washington and northwestern Idaho. It is not expected that the construction of this branch will be commenced before next spring. Extensive surveys have been made in the Clallam county peninsula, and a line is projected around Olympia to Port Angeles, on the strait of Juan de Fuca. Nothing has been done on this branch, and it is doubtful if it will be built for several years.

Electricity will probably be used in the near future on the 800-mile stretch through the mountains, where water power is abundant and tunnels frequent. The consulting engineer having charge of the extensive electrification projected on the

CONSTRUCTION OF THE ST. PAUL PASS TUNNEL; CHICAGO, MILWAUKEE & ST. PAUL.

The Pacific extension of the Chicago, Milwaukee & St. Paul crosses the main range of the Bitter Root mountains by a new and hitherto almost unknown pass, now named St. Paul pass. The tunnel now being built under the summit of this pass is 8,750 ft. long, one end of it being in Montana and the other in Idaho. The summit grade of the line, which is 3,518 ft. from the east portal, has an elevation of 4,169 ft. and is 1020.7 ft. below the surface. The tunnel grade is 0.2 per cent. each way from the summit. Electric power is being used exclusively in the excavation of this tunnel, due to physical and climatic conditions.

The map of the location of the line across the Bitter Roots



Grade Through St. Maries, Idaho; Pacific Extension of the St. Paul.

St. Joe river is now in Chicago arranging for the commencement of actual work on this project.

The Chicago, Milwaukee & St. Paul has leased a floor of the White building on Fourth avenue and Union street, Seattle, and will move its offices there soon.

The Parisian subways had an average length of 27 miles in 1907, which was $2\frac{1}{2}$ miles more than the year before. They carried 194,800,000 passengers, which is 18 per cent. more than in 1906, and the gross earnings increased $14\frac{1}{2}$ per cent., and were \$64,232 per mile of road. The working expenses were $43\frac{1}{2}$ per cent. of the earnings and have varied little from that proportion since 1903. The number of employees was 3,630 at the end of 1907; the number of cars in service was 780. Of the tickets sold during the year, $17\frac{1}{2}$ per cent. were first class, 56 per cent. second class and 26 per cent. were return tickets.

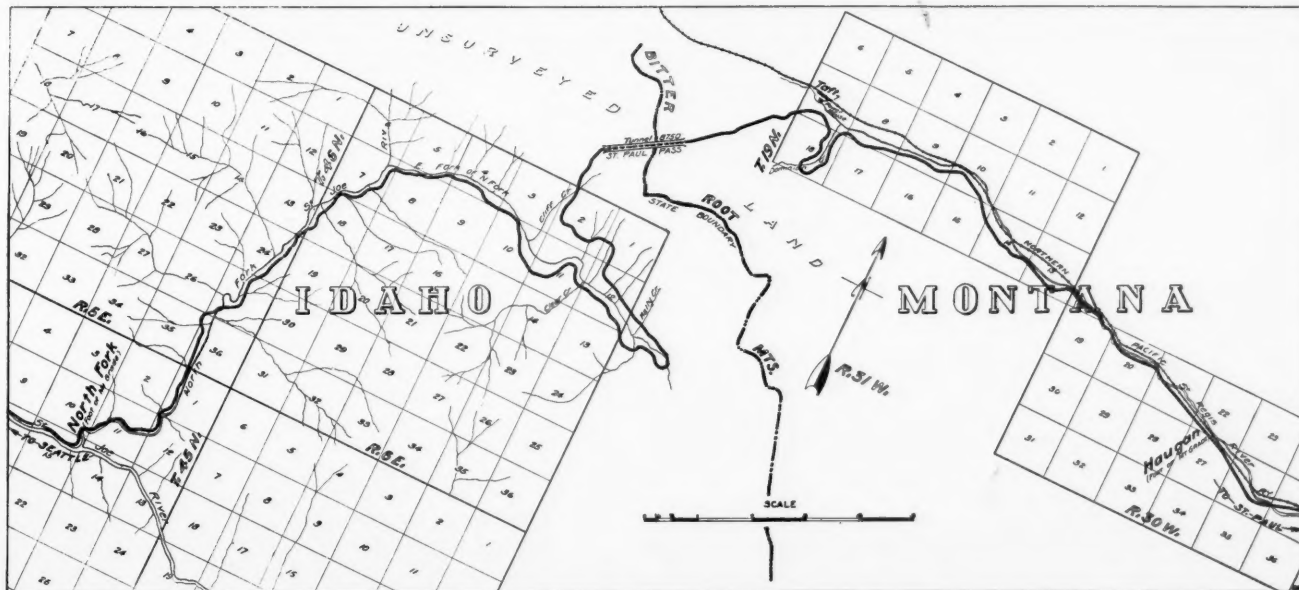
shows the C. M. & St. P. and the Northern Pacific to be quite close together until the former swings west for the mountain crossing. Opposite Taft the St. Paul line is located on the mountain slope high above the Northern Pacific. In the Bitter Roots the winters are severe and long and the snow deep. The east portal of the tunnel is $2\frac{1}{2}$ miles from Taft and it would have been extremely difficult and costly to haul fuel and heavy equipment from Taft to the tunnel. It was therefore decided to locate the power station at Taft and transmit the power electrically to the tunnel.

The power plant equipment consists of six 150-h.p. Atlas return flue boilers; two Blake boiler feed pumps; an Underwriters' fire pump, having a capacity of 500 gals. per minute; a Blake air pump and jet condenser; three Corliss engines, and three General Electric three-phase 60-cycle generators, with exciters. The capacity of the plant is 750-k.w. and the voltage is raised to 6,600 through three 250-k.w. step-up transformers. The current is carried a total distance of $4\frac{1}{2}$ miles to the sub-

stations at each end of the tunnel. The transmission line consists of three No. 4 copper wires strung on trees sawed off 35 ft. above the ground, each cross-arm being covered with a 12-in. board to protect it from snow and short-circuiting.

At each sub-station the voltage is reduced to 440 through three 100-k.w. transformers. Each sub-station contains two Ingersoll-Rand duplex, compound air compressors with a capac-

ity in the east end and Wood in the west end. The shovels are the Marion, Model 20, type, worked by compressed air. They have a special short boom to enable them to work in the limited space, and have 1½-yd. dippers. All drill steel is sharpened on a Numa drill-sharpening machine, the result being a great improvement over hand sharpening both in quantity and quality of work. The tunnel is ventilated by an Exeter fan at



Location of St. Paul Pass Tunnel; Chicago, Milwaukee & St. Paul.

ity each of 1,205 cu. ft. of free air per minute at 135 revolutions. They are driven by 200 h.p. General Electric motors. Each of these compressor outfits furnishes air for eight drills in the heading and five on the bench, for an air shovel, a drill-sharpening machine, an air hammer and the blacksmith forges. The air drills are 3½ in., Ingersoll-Rand being used

each end, drawing through a 24-in. galvanized iron pipe, each fan being driven by a 30-h.p. motor.

The general method of excavation is to drive a full face heading, follow within 60 ft. with the timber lining and then remove the bench. Owing to the changeable character of the material encountered, which is a laminated quartzite, having in many places a layer of talc between the strata, it is often necessary to change this method and take the heading out in a very small opening, then enlarge the section and follow up immediately with the timbering.

When driving a full section, six drills, working on four columns, are used in the face. The heading material is shoveled into 1 yd. cars and pushed by men, over a track supported by beams spanning the tunnel and resting on the wall plates, to a point behind the shovel working on the bench, where it is dumped through a chute into a car below. All the excavated material is hauled out of the tunnel by two 30-h.p. electric locomotives at each end.

In the east end a track incline is used to transfer cars of heading timber direct into the heading, which greatly facilitates the work and is quicker and cheaper than the old method of raising the timber with block and tackle.

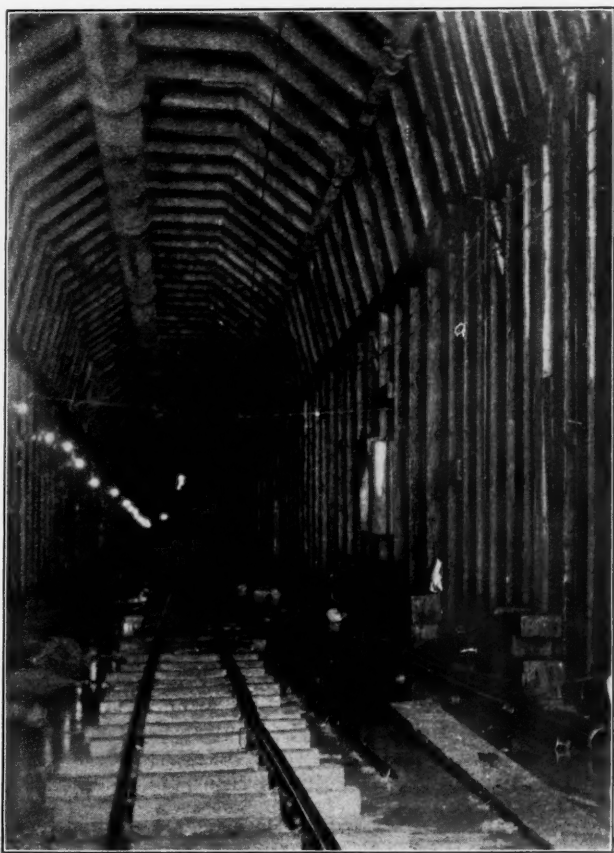
The timber lining is made up of 12 in. x 12 in. longitudinal sills and wall plates, with 16-ft. posts and a five-segment arch rib, spaced according to the character of the material to be supported, usually 4 ft. center to center; but in many places the material necessitated putting the timbers closer together. Two-inch lagging is used on the sides and 4 in. on the arch. A special timber crew does the erection in the heading, but the regular mucking crew does it on the bench.

Two shifts of 11 hours each are worked, and shifts change from day to night work bi-weekly. Unusually rapid progress has been made with the work during the past four months, the amount of completed tunnel driven being

| | |
|--------------|-----------|
| May | 563 ft. |
| June | 590 " |
| July | 534 " |
| August | 616 " |
| Total | 2,303 ft. |

The theoretical excavated cross-section contains 18.5 cu. yds. per lineal foot of tunnel.

The power plant and sub-stations are equipped with lathes,



Timber Lining of St. Paul Pass Tunnel.

shapers, drill presses, emery wheels, pipe cutting and threading devices and the usual blacksmithing tools, and the framing shed with a motor-driven swing saw for cutting lagging and wedges.

The tunnel, shops and camp are lighted throughout by electricity, and each camp has shower baths for the workmen. The power plant and each sub-station is provided with a splendid gravity water supply and fire protection system, which has demonstrated its efficiency on several occasions.

All important points on the work at each end of the tunnel and at Taft are connected by both private and long distance telephones. The company also has a hospital service well conducted, and the Y. M. C. A. has a reading and recreation room at the east end camp under the direction of a regularly appointed secretary.

The work is in charge of W. E. Dauchy, Division Engineer. K. C. Weedon is Tunnel Engineer and Winston Brothers Co. the contractor. We are indebted to E. J. Pearson, Chief Engineer, for the data for the foregoing.

RECENT TYPES OF EXPRESS LOCOMOTIVES.*

The four-coupled locomotive is still deemed suitable for express service on many railroad systems, either because the conditions of traffic allow the weight of the train to be kept under a certain average, or because the stops are far apart and the grades light. Nevertheless, it seems that its hours are numbered, not only in countries where the load per axle is limited to 15 or 16 tons, but even on lines where an adhesive weight as high as 40 tons on two axles is permitted.

The four-coupled locomotive in its most recent form, the Atlantic type, is perfectly adapted for the fastest train services, and when fitted with a wide firebox its grate area per unit of adhesive weight may attain a very high proportion, which is, as is well known, a characteristic of engines suited for fast trains.

The Atlantic type is compact, can be very well proportioned, is adapted for the use of a wide firebox, and constitutes probably the last word in four-coupled engine design. Its only disadvantage is the limitation of the adhesive weight to some 30 to 40 tons, according to the limits laid down by the permanent way staff, save in America, where a weight of as much as 50 tons is permissible. It is a recognized fact that the locomotives do not use all or even the greatest part of their adhesive weight, except on starting, on severe gradients, or in passing through tunnels, so that where the stops are fairly far apart and the road easy four-coupled engines may be sufficient with trains which at first sight would appear to be beyond their power. But this type is confined to a well-defined kind of service, and hence might be considered on certain systems as too highly specialized. The Atlantic engine, having a large proportion of its weight concentrated on the center—where are the coupled axles—has some tendency, when running at high speeds, to a pitching motion; much more so, indeed, than engines having a coupled or heavily loaded trailing axle.

Six-coupled engines mounted on large driving wheels behave as well at the high speeds actually attained as four-coupled engines, while they are able to start heavier trains and to accelerate them more quickly. They have, in fact, a reserve of tractive power which proves very valuable upon occasion. At the same time, being less specialized, they are available for a greater variety of service, and may be employed for heavy slow trains with frequent stops, or even, in case of necessity, for goods trains.

Adhesion is only one factor in the power of locomotives, and is, indeed, as we have said, only fully utilized for a comparatively short time. But while it determines the maximum tractive effort actually obtainable, the grate area is the principal factor in deciding the tractive effort which any given engine can exert at the highest speed it may be called

upon to attain, or, inversely, the maximum realizable speed for a given tractive effort. To put it in another way, the maximum *static* effort is settled by the adhesion, while the work which any locomotive can develop is decided by the area of the grate. Thus the latter may be, in some sort and within certain limits, independent of the weight available for adhesion; the work, proportional to the product of the two factors, speed and tractive effort, can be constant for important relative variations of each of these two factors.

Take the case of two engines having the same boilers and the same grate area, one of the Atlantic and the other of the 4-6-0 type. They will both be able to maintain the same tractive effort at the same speed—say, 50 miles per hour—but the second will possess as its sole advantage the power of making a quicker start or of developing its maximum power with a heavier train at lower speeds. If, on the other hand, the increase of adhesion ought to correspond with the traction, at the same given maximum speed, of heavier trains, it ought of necessity to be accompanied by a proportional increase of the grate area. But the provision of a large and deep firebox is much more difficult on an engine with six-coupled wheels of large diameter than on a four-coupled Atlantic engine.

As a matter of fact, if the narrow firebox is retained in the latter type, as the trailing wheels are of a comparatively small diameter, it is possible to give the firebox a sufficient depth without raising the boiler too much, or giving the grate an excessive inclination. Typical examples of this arrangement may be seen in the Atlantic engines of the P. O., Nord, and P. L. M. in France, and the North-Eastern, Great Central and Lancashire & Yorkshire in England.

If, on the other hand, the wide firebox is adopted, it is not necessary to give to the boiler the excessive length which it attains in the Pacific type, and it is possible to obtain the same grate area with much less total weight, but the adhesive weight is, of course, smaller too. Most of the great American railroads, the Great Northern & Brighton in England, and the Prussian State Railways, have Atlantic engines with wide fireboxes in service, but though such engines are compact and powerful, their adhesive weight on account of the continual increase in the weight of trains, is growing more and more insufficient on some systems, or at least on difficult and hilly sections of such systems. The type appears to be principally suitable for lines on which axle weights of 20 tons and over are allowed. In the United States some Atlantic engines take 50 tons on the four-coupled wheels, while in Germany and Italy such a weight cannot be carried on less than three axles; but as the weight of trains in America is greater than in Europe, the situation is about the same, and the Atlantic type is there also becoming insufficient.

The combination of the wide firebox and six-coupled wheels of more than, say, 5 ft. 6 in. diameter, has led to the introduction of the Prairie and Pacific types. The obvious difference between the two designs, namely, the use of a leading pony-truck in the former, and of a leading bogie in the latter, appears at first sight to be of small importance, but it carries with it a factor of more account, for while the cylinders of the Prairie type are placed between the leading and the coupled wheels, in the Pacific type they are brought more to the front between the wheels of the bogie. The result is a notable lengthening in the Pacific engine, not only of the frame, but of the boiler. As far, however, as the latter is concerned, the whole length available for the tubes is not used, either to avoid a surplus of weight or to obviate the troubles that might result from the use of very long tubes. In fact, the Prairie type is really a mogul engine, but it has a wide firebox over a fifth axle, trailing and non-coupled. The Pacific, on the other hand, results from a similar transformation of the 4-6-0 engine, or better still, of the Atlantic type, with a wide firebox, lengthened in the center by the amount necessary to permit the introduction of a third pair of coupled wheels between the cylinders and

*From a paper in *The Engineer*, London, by Maurice Demoulin.

the firebox. These two types can thus be considered as resulting from the adaptation of the wide firebox to engines having six-coupled wheels of more than 5-ft. diameter. The development of the Pacific and Prairie types, which are necessarily long engines, is made easier by the fact that the driving wheels of express engines are now made of a rather smaller diameter than of old. There is, indeed, a general tendency to think that wheels of 6 ft. 3 in. to 6 ft. 7 in. are quite sufficient for the highest speeds, and hence these engines have boilers appreciably shorter than if it were deemed necessary to provide them with 7-ft. wheels.

The Prairie type offers similar advantages to those of the Pacific, namely, the combination of the wide firebox having a large grate area with six-coupled wheels of large diameter, but it does not permit of such a great increase of power. It has one axle less, and its weight is kept proportionately smaller. For equal adhesive weight the Prairie type carries of necessity a less heavy and less powerful boiler. Furthermore, some engineers consider it less steady, the leading pony, or Bissel truck lacking from this point of view some of the advantages of a bogie.

Putting aside the question of steadiness—to which we shall return later—the choice between the two types of engines is decided by the relation which it is desired to establish between the adhesive weight P and the grate area S , while bearing in mind the preceding considerations. The ratio $\frac{S}{P}$ is, of course, for any given type of engine greater, as it should normally be able to draw, at a higher speed, a load proportional to its adhesion; therefore the Pacific type can be more specially adapted for high speeds than the Prairie engine as long as the load is a maximum. The latter (2-6-2) will give to some extent the advantages of the former, while it keeps within the limits of weight and complication of the Atlantic type, but the former (4-6-2), having a larger boiler, will be more powerful. It is thus, indeed, that the problem has been generally understood. The Pacific type has been recently introduced on several European lines where the speed and weight of trains are considerable and the stops far apart—Great Western and Paris-Orleans, for instance—while the Prairie type has been usually adopted on lines with a lighter permanent way and a less heavy traffic. The Prairie engine, for example, designed by the State Railways of Italy for express service, is certainly remarkable, and particularly well suited to the traffic it has to deal with. This engine—Fig. 1—has a grate area of 37 sq. ft., its wheel base is less than 23 ft., and its total weight in running order only 70.7 tons. The steadiness of this engine compares very favorably with that of any 4-4-2 locomotive—a type to which, indeed, it is closely related, being in reality an Atlantic locomotive in which the second axle of the bogie is coupled; it is fitted with the Zara-Bissel bogie, and the truck axle, in conjunction with the first coupled axle, forms a bogie with lateral play so controlled and arranged that while the front axle moves radially the second axle moves parallel to itself by an amount compatible with the coupling. In a word, these engines have a leading bogie with a long wheel base, but of which one of the pairs of wheels is coupled. The flexibility and steadiness are very satisfactory, and the wear of the crank pins of the front coupled wheels is in practice very small. This interesting arrangement is a real improvement of the Prairie type, particularly for difficult lines where the curves are sharp and frequent.

The 2-6-2 and 4-6-0 types have the same number of axles and the same adhesive weight for a given load per axle, but in all other respects they are radically different. In the 4-6-0 engine mounted upon large wheels the firebox has obviously to be of the narrow type, and the grate area is limited to some 34 sq. ft. If the fuel used is of sufficiently good quality—as, for example, on lines burning the best Welsh coal—to make useful an adhesive weight of 50 to 55 tons, with a grate not exceeding the dimensions given, this type, of which

there exist in England some notable recent examples, appears to be preferable to the ordinary Prairie type for express trains, more especially because it has a leading bogie. On the other hand, for suburban service, the Prairie type possesses numerous advantages in its general arrangements, and is better adapted to receive coal bunkers and water tanks.

If, on the contrary, the inferior grade of the coal or any other reason renders necessary a grate area exceeding 34 to 35 sq. ft., the wheels being of large diameter, the Prairie type has to be adopted, unless, of course, the number of wheels can be increased, and then we have the Pacific type.

It is well known that the steam production of a boiler and the power of a locomotive do not increase proportionally with the increase of grate area. The typical high combustion apparatus is the old deep firebox, for many years common, in England particularly, fitted with a brick arch deflecting plate, etc., in which frequently as much as 130 lbs. and even 140 lbs. of coal per square foot of grate per hour was burned. Under the same conditions a wide firebox having 47 sq. ft. of grate area would burn 6,000 lbs. of coal per hour, which is much more than one stoker can possibly handle, particularly on a long journey.

We must, then, consider the wide firebox from two points of view: First, when the coal is of a good standard quality, thus allowing the consumption per square foot to be reduced, and facilitating stoking, while at the same time ensuring an increase of power; and, secondly, when the fuel is of a kind unsuitable for the high rates of combustion.

Independently of the difficulty of supplying fuel for a very high rate of combustion to a furnace of 40 to 50 sq. ft., other considerations limit this combustion. The wide firebox, being designed to extend over a pair of wheels, cannot be very deep, while the depth of the firebox appears to be one of the most necessary factors for complete intense combustion. It is difficult, while running, to regulate the thickness of the fire and its combustion over the whole area of a very large grate. The position of the ashpan is not always such as to permit an easy and regular flow of air to all parts of the grate. The front corners of the furnace on each side of the tube plate are apt to become dead areas, the draught being less efficient there than in the center. Large grate areas are also uneconomical where long stops have to be made, as in goods engines, because of the high consumption of fuel during such stops, which, obviously proportional to the area of the grate, it is impossible to reduce below a certain minimum. Under these conditions it is not surprising that many engineers are reluctant to pass from the 34 sq. ft. grate—the approximate limit of the narrow box—to the 45 or 50 sq. ft. of the wide firebox, particularly when they have at their disposition a good class fuel.

If, on the other hand, one looks at the question from the standpoint of evaporation, the advantage seems all in favor of the wide firebox, both on account of the increase of direct heating surface and of tube surface, the latter being due to the great length of the tubes in engines of the Pacific and Prairie type. It seems also probable that the use of the wide firebox will lead to a reduction in the cost of maintenance and repairs. The reduced length of the box for a given grate area, the better form and disposition of the lateral water spaces, the possibility of widening them, with the consequent lengthening of the stays, and the better circulation of the water, are all elements likely to reduce the chances of leakage and the wear of the different parts of the firebox. It is, however, possible that a longer experience will prove that the wide firebox has its own particular weaknesses.

The author has no partiality in favor of big engines in themselves. On the contrary, he believes that the most advantageous policy is probably to make the best of moderate size engines, using good coal, and to push them, as long as the efficiency of the boiler is not reduced below a good average, and the wear and tear is not abnormal. He is well aware of what some English companies can do with locom-

tives having not more than 28 sq. ft. grates, and believes that the use of very good fuel and an intense draught is one of the best ways of increasing the power of locomotives. But the system has its limits, and first grade coal is not available at a reasonable price in most countries.

The increase of grate area, so general in locomotives of all countries, constitutes a real and undeniable advance, on the understanding that it should not exceed the conditions, nor be accompanied by a large and intentional reduction of the combustion per unit of surface, a reduction contrary to the principle according to which the efficiency of the locomotive falls as the weight per unit of power increases.

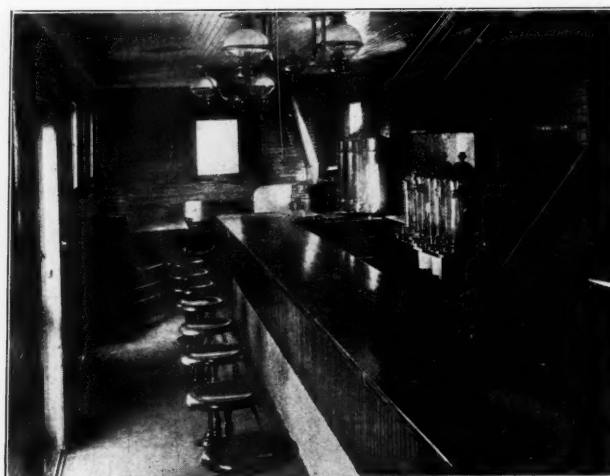
Under these conditions and with these reservations, the Prairie and Pacific types are very probably the engines of the future in Europe, the first more particularly reserved for lines with a moderately heavy traffic—unless heavier axle loads are permitted, as in the United States; the second on the great lines where the speed and loads are considerable. They both represent a rational type combining large grate areas, with the use of six-coupled wheels of large diameter; they are well balanced and very steady. Their development in Europe is probably only a matter of time, but is closely connected with the improvement and strengthening of the permanent way in some countries.

As far as the number and position of the cylinders is concerned, it is difficult to say with any certainty what arrangement will prevail, and it is possible that no single type will become general. The Americans build more powerful locomotives than any made in Europe, and adhere to the use of two cylinders as large as 22 in. by 28 in.; they do not seem to fear the effect of such enormous stresses on two crank pins only. Many European engineers, on the contrary, prefer dividing the load on four cranks at 180 deg. to each other, which besides permits of balancing the reciprocating weights. This appears to be a rational arrangement for powerful engines, and there are good reasons for believing that it has come to stay, at least in well-defined cases.

In the case of four-cylinder engines, either simple or com-

A NOVEL RAILROAD EATING STATION.

Due to a change in schedule of some of its trains, the eating station of the Chicago & North-Western at Douglas, Wyo., was no longer convenient for use. Trains now reach Orin Junction at meal time, but the company did not feel justified in building a restaurant there because of uncertainty as to how long it might remain an eating station. Instead, it was

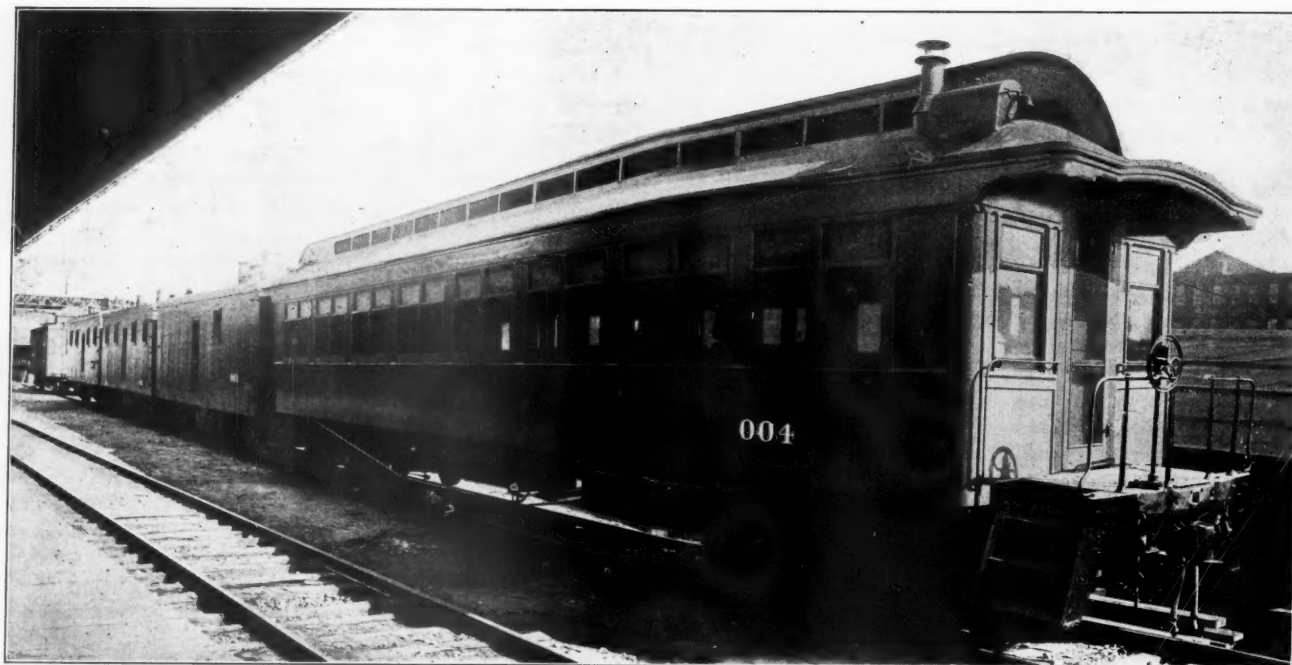


Interior of Lunch Car.

decided to provide a portable restaurant that could be moved from one point to another as occasion might require.

This portable eating station, views of which are shown herewith, is made up of four cars. The passenger car is fitted up as a dining room with tables down the center of the car. The car next to it is the kitchen. Beyond this is the lunch room, and the last car is the crew's quarters.

The kitchen car has big refrigerators. The lunch car has counter and stools, coffee urns, etc. The engine crew eat



Portable Eating Station for Wyoming Lines; Chicago & North-Western.

pound, I am inclined to prefer having the four cranks mounted on the same driving axle, at 180 deg., of course. The wear of the driving axle-boxes with powerful engines is a constant source of trouble, and it seems rational to reduce the fore and aft pressure on box brasses by balancing the stresses.

apart at the small table in the far corner. One-half of the quarters car is for the manager and his wife, and the other half has bunks for the waiters and cooks. There is also a cosy corner, with a table, for reading or playing games. The outfit is in charge of the dining car department.

TRAIN DESPATCHING BY TELEPHONE.*

BY G. W. DAILEY.

For a good many years the telephone has filled a minor, but, nevertheless, important place in the communication system of our road, as well as other roads. Its principal uses in the past have been in connecting up outlying switches with telegraph offices, small stations with telegraph stations, connecting round-houses, coal sheds, etc., and in the larger yards connecting various switch shanties, scales, ice houses, round-houses, etc., with the yardmaster's office. Notably as an illustration of such use, we have had for the last three or four years a very extensive yard system in the Chicago terminal district; the train master of freight terminals being able at all times to communicate at will with all round-houses, freight houses, etc., as well as with all his yardmasters; they, in turn, being able to communicate readily with all parts of their particular yards, etc.

This yard system has proved of untold value in handling the terminal business and could not now be dispensed with, or replaced with anything that would answer the purpose as well. The same system on a smaller scale has been in use in Clinton, Boone and other yards, for several years. Many important instructions are issued and hundreds of car numbers, initials, etc., handled over these yard telephone lines every day. The errors and misunderstandings have been so few and the operation of these yard lines so successful that it had quite a bearing upon the determination to extend the use of the telephone in our service. It also served to demonstrate the superiority of the telephone over the telegraph for such uses, due to its greater speed and flexibility, as well as to the fact that any yardmaster, yard clerk or ordinary employee can use it to equal advantage and does not have to look for a telegrapher to do his talking for him.

The next step was taken last year when we equipped the following districts with telephones for blocking trains: Madison Division—Harvard to Elroy, and Milwaukee to Montfort; Wisconsin Division—Milwaukee to Fond du Lac; and Iowa Division—Boone to Missouri Valley. The telegraph block instruments were taken out, telephones installed on the block wires and all blocking done telephonically since then. It has proved entirely satisfactory in every particular, and it will be noted that these districts embrace both single and double track with heavy traffic.

The next step was taken this year when we equipped the Madison Division—Janesville to Baraboo (in operation May 31) and the Wisconsin Division—Chicago to Janesville (in operation July 1), with train dispatcher's telephone lines, and are now completing line, Baraboo to Winona.

The standard of installation and use is alike on the two divisions, and one illustration or example will cover all. The very best wire, instruments and other material have been used, and the best workmen obtainable to install them. The line is metallic circuit, that is, two copper wires, No. 9 B. & S. gage, weighing 210 lbs. per mile, transposed every one-fourth mile to eliminate induction and outside electrical interference. The circuit is self-contained, that is, the signaling and talking is all done on the same pair of wires, and one does not interfere with the other. The calling is done as follows: In the dispatcher's office is located a box about 12 in. high, 18 in. long and three in. deep, with a row of push buttons across its face. Inside the box is a clock and three small relays or magnets, all connected. Each push button corresponds to a certain station. Each station is equipped with a box containing a clock, two relays, two coils, four cells of dry battery and a 4-in. vibrating bell, which can be heard a considerable distance, even out on platform. The dispatcher desiring, say four stations, presses the push buttons in his box

corresponding to the stations, then presses a battery button in the lower middle face of box, and the bells in these particular stations ring until shut off by the operator. They make such a racket that he is usually prompt in shutting them off and answering. By this method as many as 28 stations can be called in 30 seconds. This calling being practically instantaneous, it can plainly be seen that a great saving in time is effected over the old plan of calling by the telegraph key, when it was a common occurrence to waste from 15 minutes to an hour, calling one office. If an agent or operator is in freight room or out on platform unloading freight, he can hear his bell, and we have had cases where others have heard the bell and called the agent when he was out of hearing. The result is that there is practically no time wasted calling offices, which conserves the time of the dispatcher and enables him to utilize such time in other more profitable ways. So much for the calling arrangement.

For talking purposes the train dispatcher has a breast transmitter and a cap receiver, which leaves both hands free. Each station is equipped with a swinging arm transmitter, which can be moved into any desired position, and a cap receiver, thus allowing both hands to be perfectly free while using telephone.

The train dispatchers' circuit is for the exclusive use of the dispatcher in handling trains, and no other business is transacted over it, except as he may direct. The dispatcher is cut in on circuit at all times, but stations are not. It is not necessary for way stations to ring dispatcher; all they need to do is to take down receiver and pronounce the name of their station. If line is busy when they take receiver off, they simply wait until it is clear. Stations desiring to communicate with each other must request dispatcher to call the other offices for them, as they cannot do so themselves. This is so arranged in order to give the dispatcher entire control of the use of the line. A secondary circuit has been established for emergency use, by transposing two iron telegraph wires. They, as well as the copper pair, are cut into switchboards at every third or fourth office and equipped with hand-throw switches. If any trouble comes in on the copper pair, for instance, between Barrington and Crystal Lake, the dispatcher locating same between these offices directs those two offices to cut in the emergency iron pair at each place. One movement of the switch does this, and the line is again ready for use. When trouble has been cleared the lines are restored to normal. The transposed pair of iron wires are, of course, used for telegraph work when not patched into the copper pair. Even then they can be used either side of the patch. One movement of the switch cuts out both telegraph and telephone at any station, and this is done when leaving office for any length of time or when closing for the night.

In handling train orders by telephone it should be remembered that all rules and regulations governing train movement remain the same as under the telegraph. No rules or practices have been changed and everything that has been done is still done, the only difference being that they talk instead of work a telegraph key. The orders as delivered to conductors and engineers are just the same in form, appearance and every particular as they have been and are handled exactly the same as heretofore. In issuing a train order, the dispatcher, after calling the stations he wants, proceeds with his order in the same form and formula as if by telegraph. The names of all stations, conductors, train and engine numbers and time are first pronounced plainly, then spelled out letter by letter and figures duplicated, naming each figure separately. When speaking the order the dispatcher is writing it in his record book, which is quite a material safeguard over the telegraph practice. When he is done speaking he is done writing and ready for the repeating by the operators. This reduces his speed of conversation to his own ability to write it down and also gages the speed for the receiving operator out on the line and does not hurry him unnecessarily. The operators

*Mr. Dailey is Superintendent of Telegraph of the Chicago & North-Western. He has had telephones in use for despatching over three months and he tells of his experience more in detail than have other writers.

repeat the orders back to the despatcher in the same way, giving "X" acknowledgment, etc., same as ever. All operators concerned listen to each other repeat, thereby checking each other. The despatcher underscores each word and figure in his record book as it is being repeated by each operator. Following are two illustrations of orders; the hyphenated words and figures being spelled out letter by letter. The orders as delivered do not show these spacings or brackets, which are merely used for this illustration:

Example I.

Order No. 49.

To C. & E. No. F-i-f-t-y F-i-v-e (Five Five):

Extra E-l-e-v-e-n S-i-x-t-y S-i-x (Double One Double Six) and No. F-i-f-t-y F-i-v-e (Five Five) Engine S-e-v-e-n (Seven) J-o-n-e-s will meet at Bombay (B-o-m-b-a-y) instead of Bangor (B-a-n-g-o-r).

Example II.

No. T-w-e-n-t-y T-w-o (Double Two) Engine S-e-v-e-n-t-y S-e-v-e-n (Double Seven) S-m-i-t-h will meet No. T-h-i-r-t-y F-i-v-e (Three Five) J-o-n-e-s at Bangor (B-a-n-g-o-r).

In reporting trains to despatcher, (3s) no calling is necessary—operators merely take receiver off hook, speak the name of their station, and go ahead with their business; the despatcher being cut in continuously, hears them, gives his acknowledgment, etc., and the transaction is completed. The despatcher writes his order in his record book as he speaks it, and so is all ready for the repeat when he is through speaking. The operators can then talk it back to him as fast as they can do so distinctly and plainly. The result is that counting the time saved in calling and the quicker repetitions we find that orders and 3s are handled about 50 per cent. quicker than by telegraph. This means that the despatcher can dispose of his work that much faster, has more time to figure out movements, meeting points, etc., and can handle a great many more trains on his trick and handle them more promptly, thereby greatly facilitating train movements. It further places the despatcher in closer touch with all the little details of his daily work and in closer touch with his men out on the line.

It has been our observation that there has been a decided improvement in the work and deportment of the men out on the line, due to the fact that the conversations between the despatchers and operators or other employees are of a much more personal character than obtained by telegraph, resulting in closer working relations and more pleasant co-operation. It is more as if they were facing each other and they don't feel like indulging in some of the choice remarks that used to fly over the telegraph wire when someone would lose his temper. A [cross-grained] man don't feel as brave and cocky when he is talking directly to you. We have had instances where derailments or other accidents have occurred, and the despatcher being able to converse directly with the conductor on the ground and the conductor being able to explain things in his own way, more has been accomplished in ten minutes than could be done by telegraph in an hour under the same conditions.

Each superintendent has a telephone on his desk connected with the despatching line. He can listen in, or talk with any or all his stations at any time. He can himself check up any slackness and keep in close personal touch with everything, which was not possible telegraphically, unless the superintendent was a telegrapher, and this is not always the case.

It has opened up an avenue for employment for injured trainmen and other employees, who make first-class block operators or station agents, being experienced and much more desirable and reliable than some strange operator that might come along or some young fellow starting in. It should likewise open up a future avenue for bright young conductors to become train despatchers should they so desire. There are many young conductors who ought to make first-class train despatchers, and under telephone operation it would be a comparatively easy matter for them to do so, as they usually

have the necessary experience and all the requirements, except the ability to telegraph. The train despatchers are all enthusiastic over the telephone and appreciate it, as it lightens their many burdens to a considerable extent, and we all know they have burdens enough to carry.

Another important feature in the use of the telephone for train despatching is the fact that it works as good, if not better, in bad or foggy weather than in good—just the reverse of the telegraph. No instruments out of adjustment and no operator breaking in the middle of an order with a string of dots like a gatling gun trying to adjust himself and not knowing how. The telephone remains in adjustment in any kind of weather; the signalling apparatus may be affected, but the telephone will not be.

There are many other advantages connected with the use of the telephone for train despatching, and it is decidedly a step in advance in the method of handling trains. More trains can be handled in a given time, prompter movements can be made, emergencies handled and controlled quicker and better, everybody is placed in closer touch with each other, and it is just as safe as the telegraph, if not safer, for such purposes. When telegraph orders were first introduced, the first train and engine men handling them were afraid of them and did not want to use them. Now we would not do without them. It was a great advance over running by smoke and time card. * * * The change from telegraph to telephone operation on the two divisions mentioned was made without a hitch. All the officers and men concerned are entitled to a great deal of credit for the willing and efficient manner in which they took hold of the matter.

There is an erroneous impression that the telephone may soon supersede and replace the telegraph entirely. This will not happen in your time or mine. On the two districts equipped, while we are using the telephone for train movement business, we have retained the telegraph for ordinary messages and commercial business.

ALL-ELECTRIC INTERLOCKING AT NEW HAVEN.

The improvements in the "east cut" of the New York, New Haven & Hartford at New Haven, Conn., which were described and illustrated in the *Railroad Gazette* of August 26, 1906, have been completed and the line opened for operation. The signaling system for this section of the road consists of an all-electric interlocking station at the west end of the cut near Water street bridge (called Fair street interlocking), a mechanically operated interlocking station, just west of Cedar Hill station, and automatic signals between these two points; that is, from near the passenger station eastward to the point where the New London, the Willimantic and the Hartford routes diverge from one another, about 1¼ miles.

Fig. 1 shows a track plan of Fair street interlocking and Fig. 2 that at Mill River Junction.

The Union interlocking machine at Fair street is shown in Fig. 4. All of the wire leads from the interlocking machine to the switches and signals are carried in boxing above the ground, junction boxes being installed in the main line at every point where cross wires are run to connect with a switch or signal. Each junction box is equipped with terminals mounted on slate, and all wires are tagged in such manner that a complete test can be made from each junction station in either direction without opening any joints or cutting the insulation. This feature adds materially to the efficiency of the plant.

Nearly the entire track layout operated from this station is under bridges, and as these bridges are concrete arches spanning only two tracks to each arch, the range of view from the tower is very limited. For this reason it became necessary to install a track indicator, which is shown in Fig. 5. The face of the track indicator is a facsimile of the tracks controlled at this cabin. The tracks illustrated on the track indicator

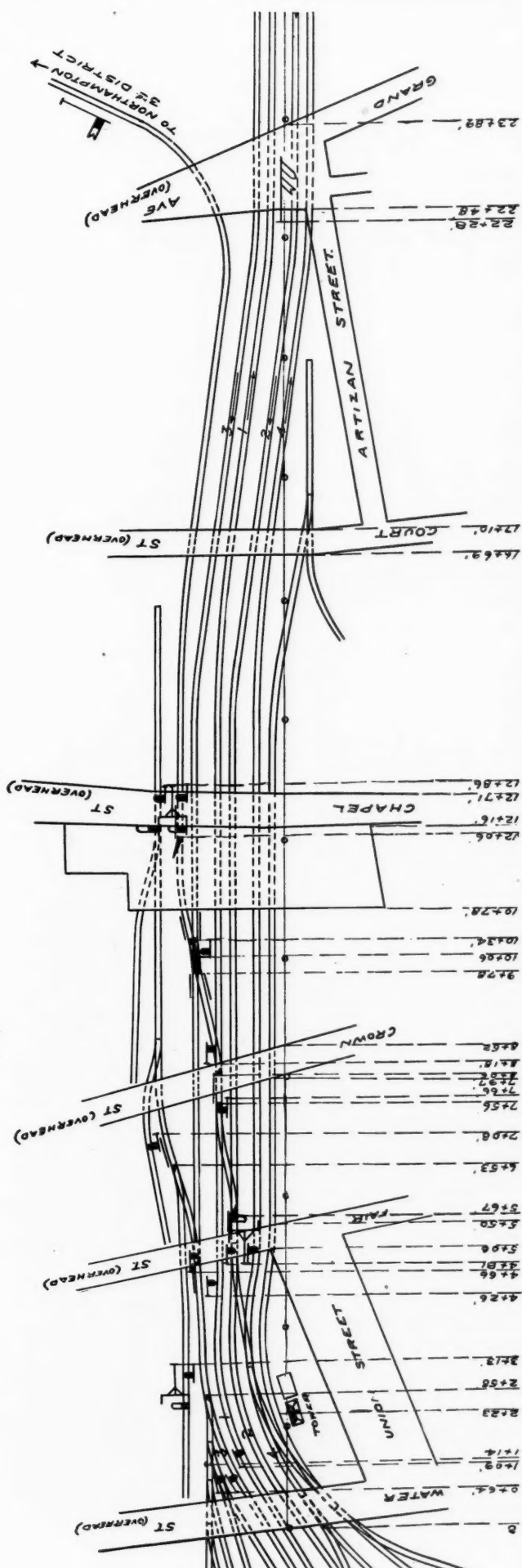


Fig. 1—Switches and Signals, Fair Street Interlocking, New Haven; New York, New Haven & Hartford.

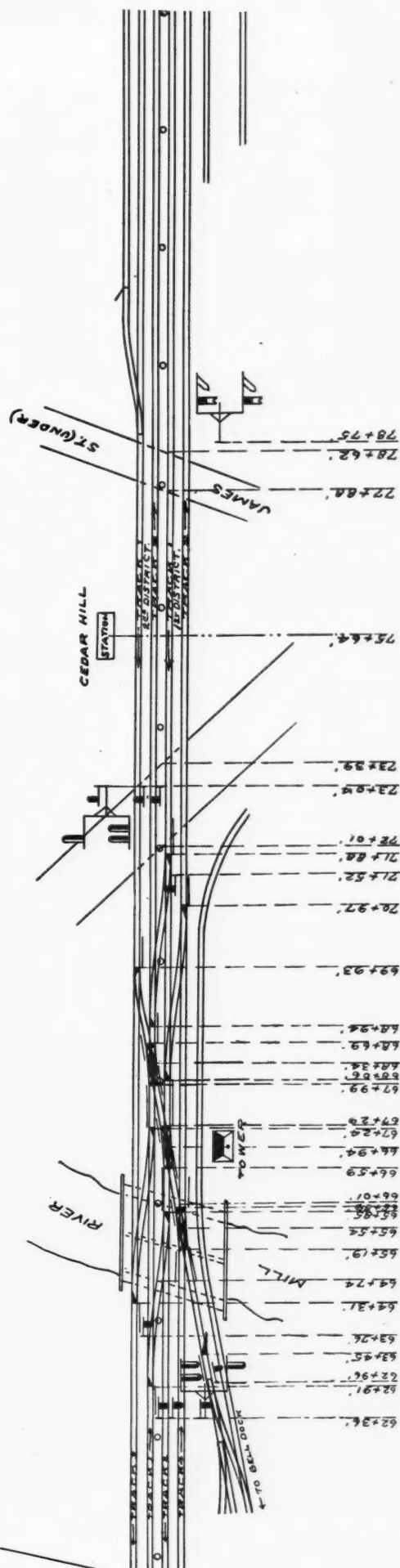


Fig. 2—Mill River Junction Interlocking.

are normally green, that is, when there are no trains on the tracks. The presence of a train on any track-circuit section turns the color on the indicator from green to red, so that red always represents a section of track occupied by a train.

This indicator, made by the Union Switch & Signal Company, is different from any heretofore described. "Track models," long familiar on electro pneumatic interlocking machines, have brass rods or strips representing the tracks, and those parts of the rods which represent switches are movable and by their movements repeat the actual movements of the actual switches. The indicator at New Haven looks like a

connections from the levers to all signals and switches. All high signals worked from this station are provided with electric slots controlled by track circuits over the route to which they govern. These track circuits also control the distant signals in connection with the automatic system, and thus the continuity of the automatic system is carried through the interlocked section.

"Back Locks" are installed on all home signal levers, controlling their normal latching, thus assuring the giving of the stop indication (and also the caution indication of distant signals), before a route can be changed. There are provided

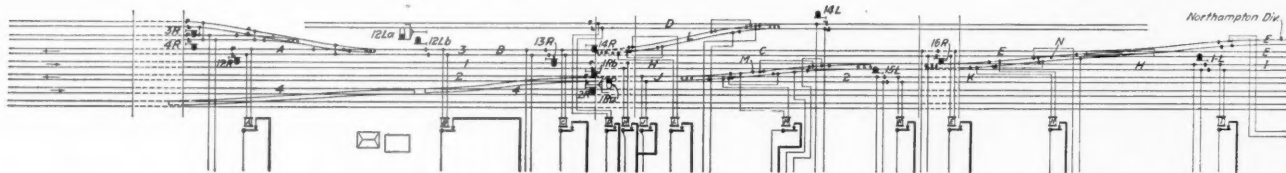


Fig. 3—Track Circuits for Electric Track Indicator—Fair Street Interlocking.

track model, but in place of the brass rods there are openings in the surface of the "map" which are filled with movable metal strips, showing green or red. The photograph, Fig. 5, does not show the difference between green and red, but we have cross hatched two sections on the Northampton division, to the left and the right of Chapel street, to show how a difference of color would be apparent if there were a train or part of train covering those sections or parts of them. The strips are parts of the armature of track circuit relays, like the disk or miniature semaphore of an ordinary block indicator. When the relay is de-energized the red part of a strip drops into view by gravity; when it is energized the green is lifted into view.

This indicator serves the same purpose as the electric-light track indicators used on the New York Central and the New York Subway. Those show the presence of a train on a section by energizing an electric light, placed behind a glass, or its absence by energizing an electric light of another color; in this the metal strips take the place of the glass and, of course, give their indications in bright sunlight as well as in shadow or darkness. In the New Haven indicator the relays are in a metal box the front of which bears the "map," as shown. At night the face of the indicator is illuminated by six two candle power electric lights, with reflectors, as shown.

Fig. 3 diagrammatically illustrates the circuits operating the track indicator. In order that the lever-man may be able to work the switches and signals from his readings of the track indicator, each space between signals, and each cross-over, is provided with a separate track circuit, and each is thus a track circuit section. The indicator is divided into sections identical with the track circuit sections. Thus every movement, whether along a straight track or crossing over from one track to another, is indicated and the exact location of a train in reference to the signals is known. Referring to Fig. 3: suppose a train to pass from the Northampton division at the upper right hand corner, to track No. 4 in front of the cabin, the sections on the track indicator would turn from green to red as the engine proceeded, in the following order, E., N., H., M. and J.; as the last car passed off from the sections the indication would turn back from red to green in the same order.

There are also audible signals to announce the approach of trains on the main line and from the Northampton branch. This announcement is given sufficiently in advance of a train to allow the operator to set up the route and clear the necessary signals.

The mechanical interlocking at Mill River Junction, Fig. 2, controls the movement of trains to the New London or Hartford routes, or to Belle Dock. This plant is of modern design, the interlocking machine being of the Saxby & Farmer type. It is equipped with a rocker shaft leadout and pipe

in this tower block indicators for all tracks leading from the tower in the direction of traffic, and these are controlled by track circuits to the next block, so that the lever-man may know as soon as a train clears. The same track circuits also control the electric slots above mentioned, thus providing against the possibility of clearing a home signal with a train in the section. There are also audible signals given at this tower for the approach of trains, the same as at Fair street.

The automatic signal system commences at Grand avenue and spaces trains approximately 2,000 ft. through the cut and as far as the tower at Ferry street at the junction of the

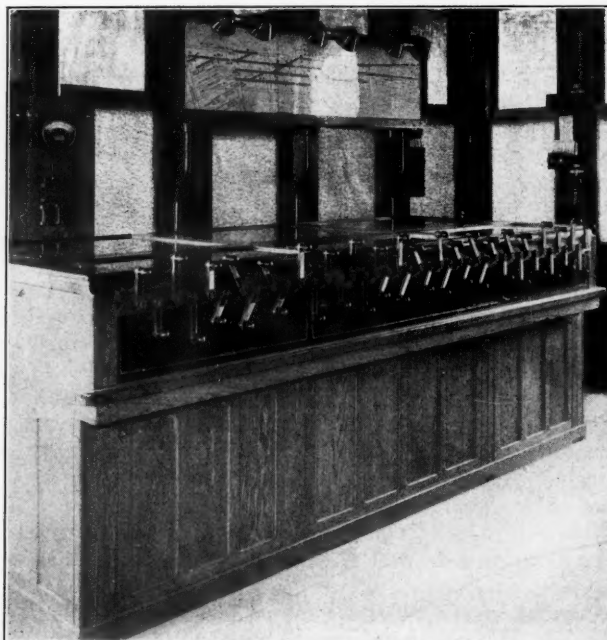


Fig. 4—Union Electric Interlocking Machine, New Haven.

Shore Line and Midland Divisions. The most interesting feature in regard to the automatic signals is that owing to the lack of clearance room between the tracks and the walls of the cut, special signal construction was necessary. Fig. 6 shows one of these signals, a suspended signal, with a center-attached arm. These signals were described in the *Railroad Gazette* of November 29, 1907, page 646, and January 17, 1908, page 95. The signal in Fig. 6 is for Track No. 4, an east-bound track, and is placed on the left of the tracks because of the curve in the line. Track 3 is westbound. In the engraving, the outlines of the arms and roundels of the signal have been picked out because of the dimness of the photo-

graph. The vertical member of the New Haven suspended signal is a heavy casting and the support therefore has to be strong. In this case 15 in. channel beams are used. They are 11 ft. 4 in. long and the left hand end of each is held down by two 1 in. anchor bolts 4 ft. long. The lower ends of the bolts are fastened in the masonry by 3 in. x 3 in. plates. Besides these bolts there is an expansion bolt at about the

installation is the electric generating and distributing system.

The electrical requirements necessary for the signal system are 110 volts for the electric interlocking, the automatic signal system and the electric lighting of the signals, and 8 volts for the track indicators, track circuits, electric slots and electric locks. To provide this current constantly and without probable chance of interruption, it was decided to install a

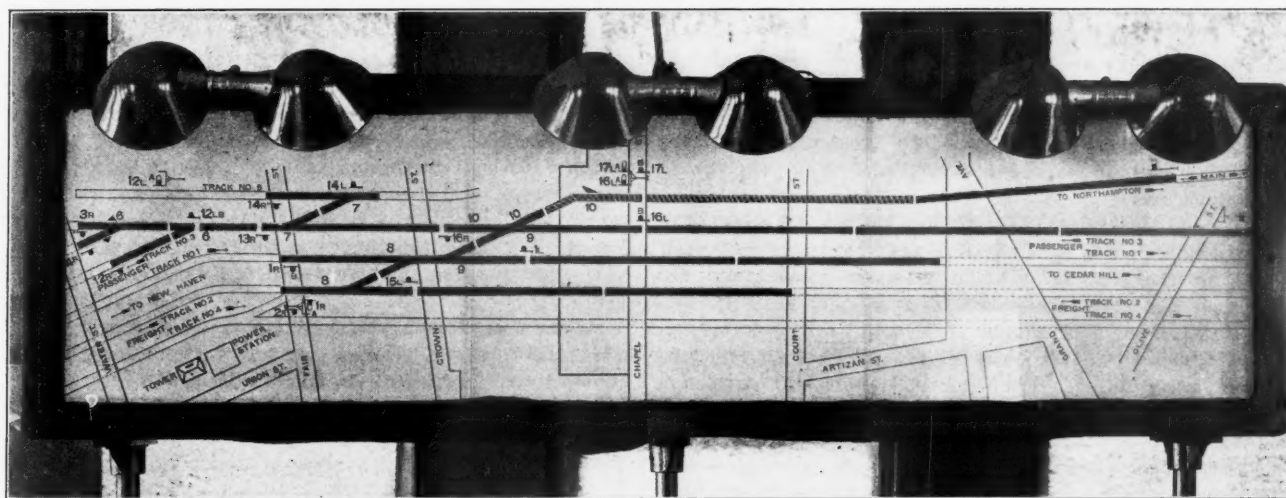


Fig. 5—Electric Track Indicator, Fair Street Interlocking, New Haven; Made by Union Switch & Signal Company.

middle of the beam, extending down into the masonry 2 ft. 4 in. The inspector's ladder, though attached to the wall, is not vertical, but is inclined so as to facilitate ascent.

In the whole automatic system the signal motors are worked by direct current at 110 volts. All of the signals throughout the entire installation are electrically lighted and all of the track circuits are operated from the power distributing system, and the most novel feature of the entire

small electric light and power system and to have all machines and storage batteries in duplicate.

One of the main generating units runs all of the time, with the duplicate storage sets in multiple. From these units are operated the electric interlocking plant, and the electric lights for all signals and the small motor generators. The small motor generators, two of which are located at the power station and two at the Cedar Hill interlocking station, each have

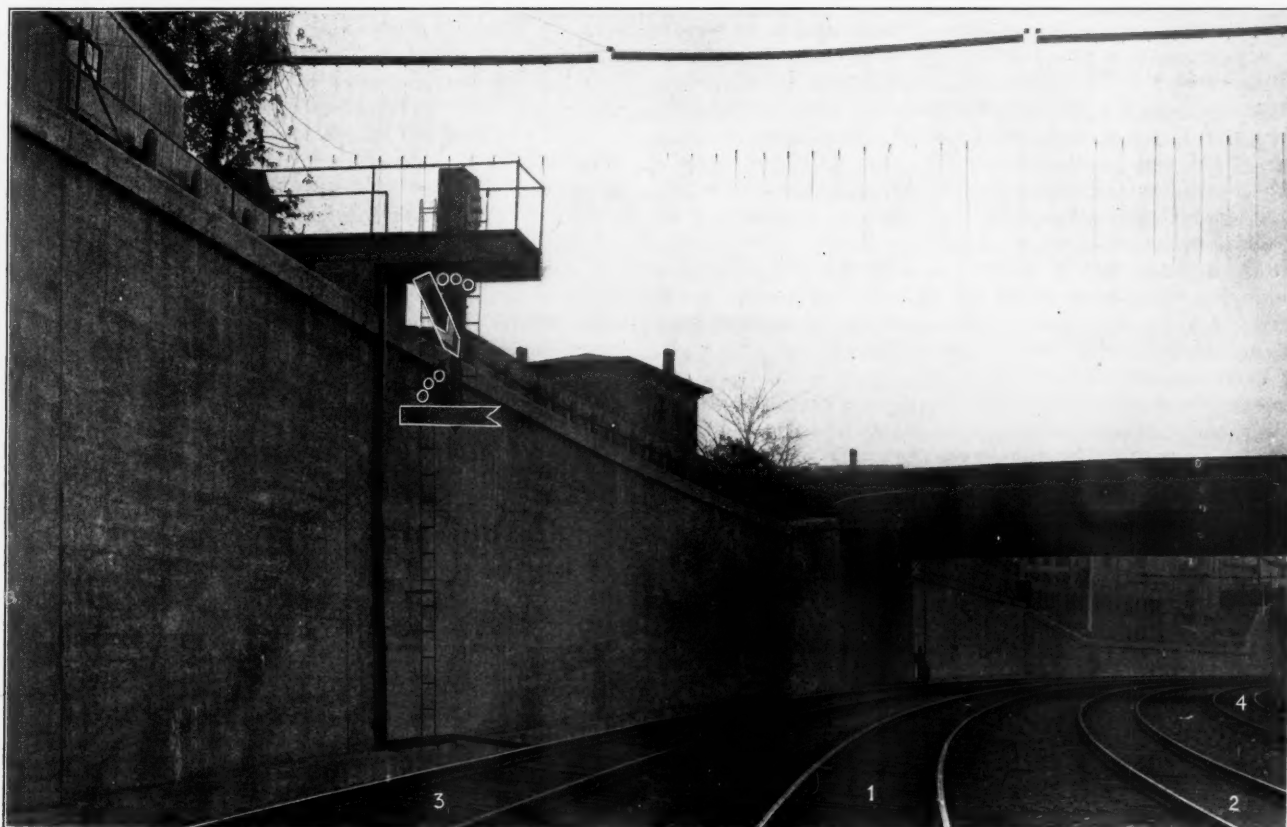


Fig. 6—Suspended Signal in New Haven Cut, New York, New Haven & Hartford.

a duplicate set of storage battery in multiple. One of the small units at each place is operated constantly. These small units furnish current for the track circuits, track indicator and slots. The two main generating units each consist of a 5 h.p., 550 volt motor directly connected to a shunt wound, $2\frac{1}{2}$ k.w., 150 volt generator. The motor takes current from a local street railway power station and generates current for signal consumption, any excess current flowing into the duplicate set of storage cells. In case the signals require more current than the dynamo is generating, the storage battery furnishes it. There are also four motor generators, 75 watt, 9 volt, compound wound, with the shunt field excited from the 110-volt circuit which operates the motor. This feature makes possible a very close regulation. In multiple with the small units are duplicate sets of storage cells. The motor generator furnishes current at 8 volts and operates in regard to the storage battery in the same manner as the large units above described. Two of these four motor generators furnish current for the signals at Cedar Hill interlocking station. All of the storage batteries used in connection with the system are 80-ampere hour and of the Planté type. From the main switchboard in the power station the entire power distribution is controlled. Power for the automatic signals is taken from the two power mains wherever the signals are situated.

Both the large and the small generating units are designed to operate in parallel and the switchboard wiring is arranged so that the signal system may take current from the two motor generators running in parallel, or two batteries in parallel; or either one of the two motor generators and the two batteries in parallel; or both of the motor generators and one of the batteries in parallel; or both motor generators and both batteries in parallel. This applies both to the large and the small size units; thus affording the utmost possible flexibility of charging and discharging the batteries.

As the control of the large generating units is through automatic overload and no load circuit breakers, any interruption of the 550-volt current results in the stopping of the motor generators, and the entire signal system is then operated from the storage battery. Thus it is not necessary for an attendant to stay in the power station.

The consumption of current for the operation of the signal system averages 8 amperes, the minimum being about 3 amperes and the maximum 49 amperes. All rubber covered wires in the system are "Okonite."

The continuously running feature of the power generating units renders the system highly efficient as compared with the usual equipment designed to operate signals from storage battery, with the battery charged at intervals, say of twice a week. The table below shows a comparison of the two methods, column A showing the elements of cost with generators running continuously, operating the signals direct, and working at 50 per cent. of their rated capacity, and column B the elements under the plan of working the signals from storage battery and running the generators intermittently (duplicate batteries, capacity for one week, batteries charged twice weekly).

| | A. Direct working. | B. Working by storage battery. |
|---|-----------------------|--------------------------------------|
| Size of generator | 2.5 k.w. | 15 k. w. |
| Number of generators | 2 | 1 |
| Size of storage battery cells | 80 a. h. | 800 a. h. |
| Number of storage battery cells | 104 | 110 |
| Floor space for power plant | 275 sq. ft. | 1,050 sq. ft. |
| Efficiency, energy delivered to generator | 70 per cent. | 60 per cent. |
| Ratio, first cost (estimated) | 1 to | 5.65 |
| Ratio maintenance per year (estimated) | 1 to | 7.95 |

This signal system was designed and installed by the signal department of the road, C. H. Morrison signal engineer.

The Hungarian State Railroads earned gross 7.9 per cent. more in 1907 than in 1906, but their working expenses increased 21.3 per cent., leaving a decrease of 15 per cent. in net earnings. The great increase in expenses was due chiefly

to higher rates of pay to employees, for which they had been struggling for years; but partly also to higher prices of supplies. Meanwhile traffic fell off.

AUSTRIAN PETROLEUM TRAFFIC.

The negotiations between the Austrian State Railroads and the petroleum producers of Galicia, who asked that these railroads relieve them of their surplus product by using it for locomotive fuel, have resulted in a contract, by which the State Railroads will take, not crude oil, but the crude from which the benzine has been distilled, and for this purpose will establish a refinery in the oil region and lease it to the owners of the oil mills, and in the fall of 1909 will begin to take oil for the railroads in Galicia, storage tanks being provided for the contents of 30,000 tank cars, the cost of which storage tanks will be met by ratable deductions from the sums paid for oil. For the first six months 22,500 tank carloads will be taken, and for the five years for which the contract is made 150,000 carloads. The price is to be a proportion of what the cost of coal would be: not quite so much. It is expected that oil will be used also on lines not included in the contract; but the locomotives are to be equipped so that they can change from oil-burners to coal-burners within six hours.

THE LEGAL, ECONOMIC AND ACCOUNTING PRINCIPLES INVOLVED IN THE JUDICIAL DETERMINATION OF RAILROAD PASSENGER RATES.*

BY MAURICE H. ROBINSON,

Professor of Industry and Transportation at the University of Illinois.

The active political agitation for a level maximum rate of 2 cents per mile in intrastate passenger transportation began in Ohio in 1906. After considerable discussion and full hearings¹ before the Committee on Railroads and Telegraphs, a 2-cent passenger fare act was reported, passed both houses of the legislature, was signed by the governor and was put into operation by the railroads² without any attempt being made to test its legality. During the same year the legislature of Virginia passed an act empowering and requiring the state corporation commission "to fix and prescribe a schedule of rates for the transportation of passengers by all transportation companies," and further provided that until a schedule of rates was fixed the railroad companies should issue mileage books to be sold at the rate of 2 cents per mile. The validity of this act was contested and finally it was declared unconstitutional by the state court of appeals. In the meantime the state corporation commission had been taking testimony and making an investigation with a view of determining what was a fair rate of compensation, and on April 27, 1907, handed down a decision requiring certain railroads denominated "trunk lines" to charge not more than 2 cents per mile for intrastate passenger fares. The remaining railroads were grouped into three classes and allowed to charge $2\frac{1}{2}$, 3, and $3\frac{1}{2}$ cents per mile, respectively. A third state to take action during the year 1906 was Maryland,³ where a law was passed requiring all railroads doing business in the state with certain minor exceptions⁴ to keep for sale mileage books of 500 and 1,000 miles, unlimited in time and good for the families and employees of the purchaser, at 2 cents per mile.

With the assembling of the legislatures in the early months of 1907, acts reducing the legal maximum passenger rate from 3 to 2 cents per mile were introduced in what may fairly

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¹ The representatives of the railroads were heard and among others President McCrea, of the Pennsylvania, submitted a statement showing that with a 3-cent fare that company, according to the method of prorating expenses then in use, was conducting a portion of its passenger business at a loss.

² March 10, 1906.

³ Laws 1906, c. 174.

⁴ Railroads chartered in the state whose gross passenger receipts are less than \$5,000 annually.

be called a wholesale fashion. In several of the states a 2-cent passenger fare bill was advocated by the respective governors in their annual messages⁶ to the legislatures. These bills were vigorously pushed in the committees, hurried through the legislatures and signed by the governors⁷ with inadequate consideration, in view of their economic importance to the railroads and to the public. The net result of this avalanche of passenger fare legislation during the past two years has been to provide by law for a level maximum 2-cent per mile rate in eight states,⁸ a 2-cent rate for main lines, and a slightly higher rate for subsidiary lines in five,⁹ a 2½ rate in two,¹⁰ and a 2½ rate in three others.¹¹ In addition, two other states¹² have enacted laws requiring the railroad corporations to issue mileage books that are expected to materially lower rates, and finally, when Oklahoma entered the Union as a state a 2-cent fare clause¹³ became a part of her permanent constitution.¹⁴ This remarkable movement on the part of the legislatures or other public authorities in twenty-one states,¹⁵ embracing in general the territory lying between New England and the Rocky Mountain states, and representing approximately two-thirds of the population of the country, has few parallels in our past legislative or economic history. In the spontaneity of its origin and its resistless onward sweep it is comparable with the granger movement of the seventies. The latter movement, however, was local in its scope, affecting a comparatively small section of the country, while the railroad legislation of the past two years was essentially national in its character and effects. In the latter aspect it is more like the interstate commerce legislation of 1887. The interstate commerce act differed radically in one point, viz.: it was under consideration by Congress for a period of thirteen years, during which time two important commissions¹⁶ were constituted to study the railroad problems of the day and their reports became the basis of extended discussion in the halls of Congress and the public press. The Hepburn amendment was also preceded by a long period of public agitation and full consideration¹⁷ by the national Congress.

The causes of this movement, so sudden and so unexpected, lie deep in the popular discontent with railroad conditions, in the fear of the giant railroad consolidations and in the feeling of exalted power that often comes to a democracy realizing its new found strength.¹⁸ While the active causes undoubtedly are obscure at the present time, and almost inextricably mixed with the political issues in the several states, it is clear to the impartial observer that a movement so widespread in its scope and so unanimous in its popular approval is likely to be founded on fundamental economic conditions which create the demand and approve the action when the demand is realized in the enactment of appropriate legislation.

The most fundamental of these causes rests upon the unprecedented growth of the railroad business during the past decade and the consequent increase of railroad earnings.

During the twelve years, 1895-1906, the railroads of the United States increased their single¹⁹ track mileage²⁰ approxi-

mately 24 per cent., their gross earnings²¹ 115 per cent., and their net earnings²² 125 per cent.; operating expenses, on the other hand, including as they do in American railroad accounting liberal allowances for improvements, increased only 111 per cent., somewhat less than the increase in gross and considerably less than in net earnings. The enormous increase in gross earnings is the result chiefly of the increased volume of traffic, and secondarily of the economies effected in the operating departments, particularly in the transportation of freight. During the eleven years from 1895 to 1905, inclusive, the passenger traffic almost doubled in volume,²³ while the freight traffic increased by about 120 per cent.²⁴ The economies effected, especially in the freight department, have been almost as noteworthy as the increase in the volume of traffic. An increase of approximately 100 per cent. in the number of passenger miles has been accomplished by increasing the train mileage 45 per cent. and the train load 27 per cent. During the same period, the freight train mileage increased only 21 per cent., while the average freight train load increased from 189 tons to 322 tons, or slightly over 70 per cent. The combined result of the various economies effected in the operation of trains has been to increase both the gross and the net train mile revenue by almost 50 per cent.²⁵

Notwithstanding this phenomenal increase in the volume of the traffic, accompanied at the same time by marked economies in the operation of trains, thus increasing the net earnings from two direct sources, passenger fares²⁶ have in general remained practically stationary, while freight rates²⁷ show only a moderate decline. Moreover, the actual decline in rates has affected a comparatively small number of patrons, being caused largely by the elimination of discriminatory rates through the activity of the Interstate Commerce Commission, shippers' associations, and city rate bureaus, by the development of carload traffic and by the shipment of an increasing proportion of low-grade traffic.

A third factor which has had considerable influence on legislation was unfortunately contributed by certain railroad financiers who were generally believed to be guilty of questionable practices in connection with the reorganization of several railroad systems and the amalgamation of others. The exploits of Drew, Fisk and Gould in Erie could hardly be duplicated at the present time with more vigilant public authorities, courts of finer sensibilities, and a more intelligent and active public opinion. Nevertheless the "frenzied financiers" have not entirely abandoned the railroad world, and their occasional campaigns furnish sufficient stimulus to set the legislative machines into active operation when other conditions are favorable. The series of events leading to and including the Northern Pacific corner in 1901, the purchase of the Burlington on account of the Great Northern and the Northern Pacific, and the exchange of \$200 in 4 per cent. joint bonds for each \$100 of stock; the purchase of the Jersey Central by Morgan and its subsequent sale to the Reading; Gates' meteoric entry into Louisville & Nashville and the immediate sale at a handsome profit to Morgan in the interests of the Atlantic Coast Line; the speculative recapitalization of the Chicago & Alton by the Harriman syndicate; the Pere Marquette, Cincinnati, Hamilton & Dayton fiasco: all these

⁶ Iowa, Indiana and some others.
⁷ With the exception of Governor Hughes of New York, who vetoed the 2-cent act passed by the legislature on the grounds that it had not received the consideration that was desirable and further that it was the proper function of the Public Utilities Commission to make a thorough investigation before action was taken.
⁸ Arkansas, Illinois, Indiana, Minnesota, Nebraska, Ohio, Pennsylvania, Wisconsin.

⁹ Iowa, Michigan, Missouri, West Virginia, Virginia.

¹⁰ North Carolina, Georgia.

¹¹ Alabama, North Dakota, South Dakota.

¹² Maryland, Kansas.

¹³ For a review of the railroad legislation of the past two years, see *The Railway Age* for July 16, 1907, and several succeeding issues. Also the *American Political Science Review*, Vol. I, No. 4, p. 638 et seq.

¹⁴ The constitution of Oklahoma provides that the Railroad Commission of that State may make exceptions in the case of those railroads that are able to prove a 2-cent rate is unremunerative.

¹⁵ Including New York.

¹⁶ The Windom and the Cullom commissions.

¹⁷ Hearings before the Committee on Interstate Commerce. U. S. Senate Vols. I-V, 1905.

¹⁸ It is significant that this movement followed in the wake of the great popular political uprising during which time the former bosses and political leaders were quite generally overthrown and new leaders arose.

¹⁹ The total mileage operated, including second, third, fourth, side and yard tracks, increased during the years of 1895-1905, inclusive, from 233,275.40 miles to 306,796.74 miles, or over 31 per cent.

²⁰ Gross and net earnings:

| Year. | Single track, Inc., mileage. | pr ct. | Gross earnings, Inc., pr ct. | Net earnings, Inc., pr ct. | |
|---|---------------------------------|----------------------|---------------------------------|-------------------------------|----------------------|
| 1895..... | 177,746.25 | .. | \$1,075,371,462 | \$349,651,047 | |
| 1906..... | 220,028.44 | 24 | 2,319,760,030 | 787,596,877 | |
| | | | 115 | 125 | |
| Year. | Passenger miles. | Increase, per cent. | Ton miles. | Increase, per cent. | |
| 1895..... | 12,188,446,271 | .. | 85,227,515,801 | .. | |
| 1905..... | 23,800,149,436 | 95 | 186,463,109,510 | 120 | |
| ²¹ Revenue per train mile: | | | | | |
| Year. | Inc., Pass. pr ct. | Inc., Frt. pr ct. | Inc., Both, pr ct. | Inc., Cost, pr ct. | Inc., Net, pr ct. |
| 1895. | \$0.97 | \$1.61 | \$1.37 | \$0.93 | \$0.44 |
| 1905. | 1.15 | 2.49 | 1.97 | 1.32 | 0.65 |
| | 18 | 54 | 44 | 42 | 47 |
| | | | | | In cents |
| | | | | | 1895. 1900. 1905. |
| ²² Passenger receipts per passenger mile.. | | | | | 2.040 2.003 1.962 |
| Freight receipts per freight mile | | | | | .839 .729 .766 |

events in high finance with railroads as their subject matter caused the legislatures to believe that almost any railroad concealed a gold mine, and that consequently any reduction of rates that they ordered would finally be justified from the standpoint of railroad earnings, as well as from that of political expediency. For this state of public opinion, in which the average legislator fully shared, the modern railroad financier of the extreme type is largely, if not wholly, responsible.

Finally, it is a significant fact that the legislative reduction of passenger fares began in those states where the interurban electric service has been most fully developed. The average man loves to travel, and when he found that the interurban electric lines were able to carry him and his family to the neighboring towns, quickly and comfortably, for about one-half the fare that the steam lines were charging, and still, as he was led to believe, make a liberal profit, he concluded that the latter were making an exorbitant profit on a 3-cent rate. Reasoning along these lines, the legislators, representing public opinion fairly, accurately determined to pass the 2-cent fare bills and thus throw the burden of proof upon the railroad companies in case the latter should care to appeal from their decision to the courts.

It is, of course, probable that the railroad corporations will, in many of the states affected, accept the rates prescribed by the legislatures or commissions. In that case they will have the option, within limits fixed by economic, technical and legal conditions, of furnishing passenger service of the same general character as that which they are now providing; or of cheapening the service, by reducing the number of trains per day, by lengthening the time schedules, or by cutting wages, and by using less elaborate equipment; or finally, they may gradually substitute a more economical method of conducting the legal passenger service than that in general use at the present time. In certain of the states, however, the railroads have already adopted a quite different policy, viz., that of refusing to put the 2-cent rates into effect and of appealing to the courts for the protection of their constitutional rights.^{22a} This temporary solution of the problem raises certain fundamental questions in regard to the legal rights of the railroad corporations, and in turn these legal rights depend upon certain well-known principles of economics and accountancy which it is the primary purpose of this paper to state and discuss.

II.

The legal and constitutional principles involved in the public regulation of railroad companies have been fairly well settled through a long line of judicial decisions in which the doctrines now held by the courts have been gradually developed and are now fully established. From the very beginning of railroad transportation in both England and the United States the courts, basing their decisions upon the principles of the common law, have upheld the action of the public authorities in the reasonable regulation of railroad corporations. Such regulation has invariably been interpreted to include laws against extortion and unjust discrimination, as well as those prohibiting the formation of monopolies. From the first, however, and in fact until the granger legislation of the seventies, the railroads fixed the rates for the transportation of persons and goods subject only to charter provisions and the observance of the principles above specified. The unstable conditions following the civil war, together with the rapid extension of railroad systems into the central and western states far in advance of the economic ability of the population to support them, led to competitive warfare in competitive territory with extremely low rates and the enforcement of monopolistic rates wherever competition did not exist. Rates were therefore unduly high in some portions

of the territory and unduly low in others. Under those circumstances the people, through their representatives in constituent conventions,²³ and the legislatures began to claim the power and to exercise their asserted right to fix rates and fares independently of the railroads and without review by the courts. Illinois, the leader in this movement, inserted in her constitution, adopted in 1871, among other sections²⁴ regulating railroads, one directing the General Assembly from time to time to pass laws establishing reasonable maximum freight and passenger rates. The first legislature elected under the new constitution provided by statute for the establishment of such rates for the passenger service on the railroads of the state. The Railroad and Warehouse Commission made the necessary administrative regulations and ordered the rates to be put into execution. Early in 1872 the first suit under the new law was instituted against the Illinois Central Railroad Company for charging 4 cents per mile, while the classification²⁵ made by the commission allowed that road to charge only 3. On December 4, 1872, Judge Wood, of the circuit court, handed down a decision in favor of the railroad company on the grounds that (1) the rate charged had not been proven unreasonable; (2) the fixing of rates by the legislature was an unconstitutional violation of the railroad's chartered rights; and (3) the legislature had no power to fix rates, as it had no judicial power and no means of determining whether a particular rate was unreasonable or not.²⁶ No appeal was taken, and at the time it seems to have been generally assumed that the decision would stand.²⁷ In the Neal Ruggles case, however, which was first tried in 1873 and appealed to the supreme court, that tribunal, in its decision handed down in 1878, took a position directly opposed to that of Judge Wood, and therefore reversed the decision of the inferior court, and in upholding the constitutionality of the act, laid down the following principles, which have since been the established law of the state, viz.: "The legislature of this state has the power under the constitution to fix a minimum rate of charges by individuals as common carriers, or others exercising a business public in its character, or in which the public has an interest to be protected against extortion or oppression, and it has the same rightful power in respect to corporations exercising such business, and such regulation does not impair the obligation of the contract in their charters. * * *²⁸ The right of the state legislature under the constitution to regulate and fix the rates and fares which common carriers might lawfully charge having thus been upheld by the supreme court, there remained the further question, viz.: Was the Illinois constitution, and therefore the legislation under it in conflict with the provisions of the Federal constitution and the laws drawn in conformity to its terms? This question had already been answered two years earlier in the case of *Munn vs. Illinois*.²⁹ Here it was held by the Supreme Court of the United States that the state legislature enjoyed the constitutional right "to limit the rate of charges for service rendered in a public employment or for the use of property in which the public has an interest."

(To be continued.)

²³ See Debates of the Constitutional Convention. Illinois, 1870, II., 1637, 1708, 1770.

²⁴ Other important acts affecting railroads are: (1) Relating to the incorporation of railroad companies; (2) limiting consolidations; (3) regulating the grain traffic; (4) prohibiting unjust discrimination and extortion in freight rates; and (5) establishing a board of railroad and warehouse commissioners. Laws of Illinois, 1871-2.

²⁵ The railroads were divided into four classes: A—Annual gross receipts exceeding \$10,000 per mile; B—\$8,000-\$10,000; C—\$4,000-\$8,000; D—less than \$4,000. Maximum rates were as follows: A—2½ cents, B—3 cents, C—4 cents, D—5½ cents.

²⁶ Gordon, Illinois Railway Legislation and Commission Control since 1870, p. 36.

²⁷ Davidson and Stuy, History of Illinois, p. 1030.

²⁸ 91 Illinois, 256. The McLean Co. case, in which Judge Lawrence delivered his well-known opinion, while arising under the same general act related to freight rates and turned on the question: May a state by law forbid all discriminations or only unreasonable ones? Judge Lawrence held that only unreasonable discriminations could be prohibited. He stated as an *obiter dictum* that the legislature had a clear right to fix rates so far as the power had been delegated to it by the constitution. See Gordon, op. cit., p. 39.

²⁹ 94 U. S., 113.

^{22a} The Supreme Court of Pennsylvania has declared (Jan. 20, 1908) the 2-cent law, passed by the last legislature, unconstitutional so far as it applies to the Pennsylvania Railroad Company, on the ground that "it reduces the returns from the property to such an extent as to render it unremunerative."—Chicago Record-Herald, Jan. 21, 1908.

General News Section.

The law of New York State, requiring railroad companies to pay their employees semi-monthly, went into effect Oct. 1.

At Gulfport, Miss., October 6, Judge Wood, in the Chancery Court, declared unconstitutional the act of the Mississippi legislature which penalizes railroads that remove litigation from the state to the federal courts.

The New York State Public Service Commission, Second District, has appointed an inquiry, to be held October 18, concerning the precautions which are used or are needed to prevent setting fires in the forests of northern New York by sparks from locomotives. Eighteen railroads have been summoned to appear.

Press despatches of October 6 report the strike of shop employees on the Canadian Pacific, which began the first week in August, as settled. The strikers returned to work on the conditions that existed before the strike and the company announces that the new men will not be discharged, except for inefficiency.

The Northern Pacific has decided to extend the "A B C system" of train operation from Trout Creek, Mont., to Auburn, Wash., about 500 miles, which includes 63 miles of line west of Spokane that has been under this method of operation for the past year. It was expected that the order would be put into effect last week.

A rear collision on the Toledo & Ohio Central at Sugar Ridge, Ohio, near Bowling Green, on the evening of October 1, resulted in the crushing of the two rear cars of a passenger train heavily loaded with excursionists from Bowling Green; and six passengers were reported killed. The passenger train was slackening speed for the stop at the station, when it was run into at the rear by a following freight. The reports say that no tail lights were burning on the passenger train.

The receiver of the Wheeling & Lake Erie has been temporarily enjoined by a federal court from permitting the sinking of oil wells on the right of way of the railroad company. The restraining order was issued at the prayer of the Donaldson Co. The plaintiff recites that for 20 years it has operated oil holdings in Jefferson county, Ohio; that it controls the oil rights on property on both sides of the Wheeling & Lake Erie right of way, with ducts beneath the right of way, and that the road has leased oil rights in this right of way to J. W. and Timothy Cushing, which, if exercised, would cut in half the yearly yield of the Donaldson Co. stated as \$1,000,000.

The Wisconsin Supreme Court on September 29 rendered an opinion sustaining the power of the State Railroad Commission to refuse to issue a certificate of authority permitting a railroad to issue additional stock when it has not filed a certified copy of an amendment to its articles and paid the required fee to the Secretary of State. The Minneapolis, St. Paul & Sault Ste. Marie asked for authority to issue 14,000 shares of preferred stock and 29,000 shares of common stock. The Commission refused, on the ground that the company had not paid the required fee of \$21,000 for filing amendments to its articles of incorporation in the state of Wisconsin. The road sought a writ of mandamus to compel the Commission to grant the desired authorization. The Supreme Court held that the law empowering the Commission to refuse to issue a certificate of authorization in its discretion was constitutional.

Among the important cases which will occupy the attention of the United States Supreme Court in the term which will open next Monday, is that of the Interstate Commerce Commission against Edward H. Harriman. The question at issue is whether Mr. Harriman, President of the Union Pacific, can be compelled to answer questions regarding the purchase of stock in other companies, notably the Chicago & Alton transaction. Other cases to be heard are that against the New York Central, involving a fine of \$108,000 on a charge of granting rebates on sugar; that against the Chicago &

Alton to determine what constitutes terminal facilities and the right of a railroad under the law to grant a rebate to shippers who supply terminal facilities; one against an express company as to the right to issue franks; and two cases involving the authority of the Interstate Commerce Commission to direct the distribution of cars for coal.

At Philadelphia, October 6, Judges Dallas, Gray and Buffington, of the United States Circuit Court, handed down an order allowing the government to appeal from the decision of the court in the suit of the United States in the matter of the constitutionality of the "commodities clause" of the Interstate Commerce law. The government contends that the Circuit Court erred in holding that the "clause" is not a valid exercise of the powers of Congress under the Constitution; and that the court was wrong in declaring the law discriminative and a prohibition, and not a regulation, of interstate commerce. Judge Buffington has filed his opinion dissenting from the decision of Judges Gray and Dallas, who declared the "commodities clause" to be unconstitutional. Judge Buffington says that the prior action of any state in authorizing carriers to own mines can in no way detract from the power of Congress thereafter to regulate interstate commerce. Such purchase under state authority created no obligation or contract on the part of Congress that it never would enact laws which might restrict carriers from the interstate carriage of their own products. The judge presumes that Congress in passing this act did not seek to confiscate private property, but rather to avert by due regulation the evils the carrier had itself brought about by allowing its private interest to affect injuriously its public duty. The opinion concludes: "Satisfied that under the Constitution the power to regulate commerce between the states is vested in Congress, that such power includes the power to regulate carriers thereof, and that the divorce of the dual relation of public carrier and private transportation is a regulation of commerce, I hold this law is constitutional."

Municipal Traction Company's Default in Rental.

The Cleveland Railway Co., whose property, which includes the street railways of Cleveland, O., is leased to the Municipal Traction Co., of which T. L. Johnson, Mayor of Cleveland, is treasurer, has brought suit against the Traction company for \$220,134 and interest from October 1, for the rental due on that date. When asked whether any tender of rent had been made by the Municipal Traction Co., Secretary Davies, of the Cleveland Railway Co., said: "We did not even consider that a tender was made. There were checks shown to us for the amount of the rental, but they were made in such form that we could not have accepted them." The Traction company has attempted to make payment of rental conditional on the agreement of the Railway company to pay its regular quarterly dividend of 1½ per cent. The Railway company refused to be dictated to in this fashion, and there the matter rests. There are due on July 1, 1909, \$2,026,000 Cleveland City Cable first mortgage 5 per cent. bonds of the Railway company. There is also some floating debt, supposed to be over \$1,000,000, which must be provided for. Directors of the Railway company claim that they are at liberty to use rental paid to them by the Municipal Traction Co. for any purpose which they see fit.

Yellow Pine Tram Roads Cases.

The following resolution was adopted recently by leading representatives of lumber companies at Kansas City owning tram or tap lines west of the Mississippi river: Resolved, That a committee of seven be elected to compile information as to the mileage, equipment and value of all the originating line of railroads controlled by sawmill men, located west of the Mississippi river, for the purpose of using the same before the Interstate Commerce Commission, in event of any litigation.

tion affecting said line. This committee to ascertain the probabilities of action on the part of the commission, and employ counsel to appear before the commission.

The following pledge was prepared for the signature of all originating roads willing to enter into this contract:

"For the purpose of providing the proper defense of our interests before the Interstate Commerce Commission, we pledge our roads to bear their pro rata expense of such proceedings as may be had under the direction of the committee appointed at this meeting."

Railway Business Association.

The meeting of the supply manufacturers which was held at the Waldorf-Astoria, New York, September 30, mention of which was made in the *Railroad Age Gazette*, October 2, was called with a view to forming an association for conserving in a united form the efforts of those vitally interested in lessening the present feeling of animosity, on the part of national and state officers, which is opposed to the business interests of railroads of the country. Two circular letters were sent out some time previous to the meeting, the first of which explained the purposes of such an association, and the second dealt with the manner in which the idea had been received among the supply manufacturers and also set a date for the meeting at which the association was to be organized. The enthusiasm with which the movement was taken up was well illustrated by the attendance at this meeting.

In his opening remarks, O. H. Cutler, President American Brake Shoe & Foundry Co., New York, said: "Your committee has been very much pleased at the unanimous approval given to the proposition indicated in the first letter sent out by the railroad supply interests of the country. Up to date, 106 favorable responses have been received to the circular announcement and 74 representatives have given assurance that they would be present here to-day. I may say that we have no preconceived ideas as to the lines on which the association shall be organized or shall be operated. We have provided nothing beyond temporary organization, and when this is put into effect the whole matter will be put into your hands."

George A. Post, President, Standard Coupler Co., New York, was then introduced and made a very able and enthusiastic address, summing up the entire situation and showing the necessity for such an organization as was proposed. Colonel H. G. Prout, Vice-President and General Manager, Union Switch & Signal Co., followed Mr. Post's remarks in a very able manner. (The addresses of Mr. Post and Colonel Prout were printed in the *Railroad Age Gazette* of October 2, as was a list of the names of the manufacturers who had signified their intention of belonging to the association). He closed his remarks with the following resolution:

"That it is the sense of this meeting that there should be organized an association for the general purpose of conserving the interests of the railroads of our country and the interests also of the members of the association which are eminently connected with those of the railways.

"That said association shall be composed of such corporations, firms and individuals, doing business as manufacturers of railroad materials and equipment, contractors of railroad constructions and dealers in miscellaneous railroad supplies, as may desire to be enrolled as members thereof;

"That the Chairman is hereby authorized to appoint a committee of fifteen to report to this meeting for its consideration a plan of organization for such an association, to recommend the names of suitable persons for officers of the same, together with such other recommendations as to said meeting may appear necessary and desirable."

In the general remarks which followed, T. A. Griffin, President Griffin Wheel Co., Chicago, said: "Investments in railroads have averaged many millions of dollars for extensions per year. I do not think there is an enterprise in the country where the capitalization based on the value of land and the value of property they own is so little as that of the railroads. The general public must be educated to realize how important it is that the railroads should be supported and sustained and how vitally essential it is to business life that there should be a return to a fair-minded confidence in the railroad companies." Gen.

Charles Miller, President, Galena Signal Oil Co., Franklin, Pa., said in part: "The banks of New York are full of money. You can borrow money provided you have acceptable security, at 1½ to 2 per cent., so I am informed, and yet the railroads have had to give notes at 6, 7 and 8 per cent. for money to make necessary improvements. When you restore confidence in American railroad securities you will find the railroads giving orders for all the supplies necessary." A. H. Mulliken, President, Pettibone-Mulliken Co., Chicago, said: "We can do more good in the next six months than we will in the next two years, not but that this organization is to be a permanent one, but now that the iron is hot we must get to work." Chas. A. Moore, president, Manning, Maxwell & Moore, Inc., said in part: "There is great efficiency in publicity that deals with the facts and truth and not with statistics and generalities in a careless manner. * * * I only arose to speak on the fear of getting into politics. There are no politics in it. There was no dream or thought of such and the occasion was not chosen because of any political situation. This is a situation that has to be attended to when it needs attention, and we think the time is at hand."

The following committee on organization was then appointed: Col. H. C. Prout, chairman; O. H. Cutler, T. A. Griffin, D. C. Noble, M. P. Fenner, E. S. S. Keith, H. H. Westinghouse, W. H. Woodin, O. P. Letchworth, E. B. Leigh, H. H. Mulliken, Chas. A. Moore, W. H. Marshall, W. G. Pearce and J. H. Schwacke. Just following the adjournment of the general meeting, this committee of fifteen drew up a constitution and set of by-laws and nominated the following officers for a permanent association:

President.

George A. Post, President Standard Coupler Co.

Vice-Presidents.

H. H. Westinghouse, Vice-President Westinghouse Air Brake Co.

O. H. Cutler, President American Brake Shoe & Foundry Co.

W. H. Marshall, President American Locomotive Co.

E. S. S. Keith, President Keith Car & Manufacturing Co.

O. P. Letchworth, President Pratt & Letchworth Co.

A. H. Mulliken, President Pettibone-Mulliken Co.

Treasurer.

Chas. A. Moore, President Manning, Maxwell & Moore, Inc.

The general afternoon meeting adjourned to convene again in the evening, after the committee of fifteen should have decided upon the constitution, by-laws, officers etc. The evening session was called to order by Col. Prout, chairman of the committee of fifteen. Following the election of the ticket as suggested by the committee, Mr. Post assumed the responsibilities of the presidency of the newly-formed Railway Business Association. As provided in the constitution, the following executive members were appointed:

W. G. Pearce, Vice-President Griffin Wheel Co.

W. V. Kelley, President American Steel Foundries.

Col. H. G. Prout, Vice-President Union Switch & Signal Co.

J. S. Coffin, President Franklin Railway Supply Co.

N. Paul Fenner, Jr., President American Valve & Meter Co.

E. L. Adreon, Vice-President American Brake Co.

J. H. Schwacke, Manager and Secretary William Sellers Co.

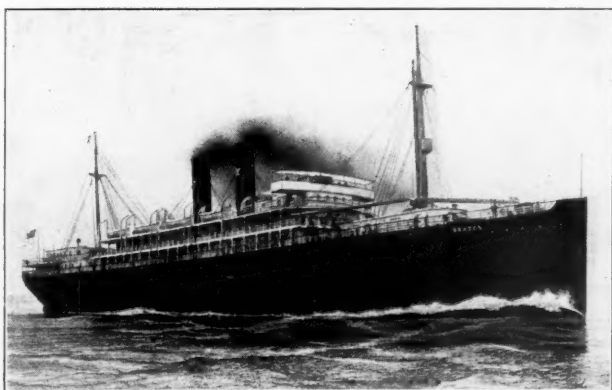
A. M. Kittredge, Vice-President Barney & Smith Car Co.

John F. Dickson, President Dickson Car Wheel Co.

Good evidence of substantial support and determination in achieving results through such an association was evidenced during the meeting on mention of the financial considerations. The initiation fee was fixed at \$100 and the annual dues at \$100. The general executive committee appointed met on October 2, when they were the guests at luncheon of Chas. A. Moore. This committee mapped out the plan and scope of the work. The present efforts are to be directed towards enlisting, as members in the association, as many as possible of the manufacturers of railroad material and equipment, contractors in railroad construction and dealers in miscellaneous railroad supplies. In addition to the list of names previously mentioned as those who had expressed their intention of being members of the association, are the following: American Brake Co., St. Louis, Mo.; Central Railway Signal Co., Postoria, Ohio; Keith Car & Manufacturing Co., Sagamore, Mass.; Monarch Steel Casting Co., Detroit, Mich., and E. L. Post & Co., New York.

Mallory Line Steamship Brazos.

The new twin-screw steamship *Brazos* of the Mallory Line started on her first trip from New York to Galveston last Saturday, October 3. Although her required speed is only 16 knots she passed Hatteras in 19 hours after leaving Sandy Hook, breaking previous coastwise records. Her average speed for this distance in this run was over 17 knots per hour. The *Brazos* was built by the Newport News Shipbuilding Co., Newport News, Va., at a cost of \$1,000,000, and was launched last June. The naval architect was T. E. Ferris, of Cary, Smith & Ferris, New York. She is 418 ft. long, over all, and 400 ft. long between perpendiculars. Her greatest beam, moulded, is 54 ft. She is 38 ft. deep from the hurricane deck, and her loaded draft is 24 ft. with a displacement of 9,800 tons, exclusive of coal, water and stores. Her net cargo space is 330,000 cu. ft., which is the space occupied by 12,000 bales of cotton, and her dead weight freight-carrying capacity is thus equivalent to 6,000 tons. The engines, which develop 8,000 h.p. are reciprocating, each unit being a four-cylinder, quadruple, four-crank engine. The engine foundations are particularly heavy, and to this fact, partly, is ascribed the absence of vibration. The cylinder diameters are, respectively, 23 in., 33½ in., 48½ in. and 70 in. Steam is supplied,

Steamship *Brazos*; Mallory Line.

at a working pressure of 215 lbs. per sq. in. from eight Scotch boilers with 24 furnaces.

The *Brazos* carries 104 first-class and 102 third-class passengers. The first-class staterooms are all outside deck-rooms, some having two berths and others double brass beds. There are also several suites and parlor rooms with private baths. The first-class state-rooms are on the saloon deck and promenade deck. The dining saloon is forward on the former deck, and the smoking room aft on the promenade deck. Writing rooms, etc., are on both of these decks. The steerage quarters are well aft on both decks. The latter accommodations are novel in that they are divided into state-rooms, with three berths each, instead of consisting of only one large compartment. The hatches and ports are large and numerous so as to handle freight quickly. The vessel is equipped with wireless telegraph. The direct service between New York and Galveston will hereafter be handled by three Mallory Line boats, the *San Jacinto* and the *Denver* being the other two. A semi-weekly schedule is being maintained between the two ports.

'Frisco Trackage Rights Into New Orleans.

The Illinois Central, which has given, in the past, trackage rights into New Orleans to both the Colorado Southern, New Orleans & Pacific and the St. Louis & San Francisco, now claims that the St. Louis & San Francisco, which has leased the C. S., N. O. & P., is attempting to get all its trains—both C. S., N. O. & P. and Frisco—into New Orleans under the contract made by the C. S., N. O. & P., and in this way to escape from its own agreement to give certain privileges to the Illinois Central in return for the trackage rights. The Illinois Central now refuses to accept trains at Baton Rouge, La., unless they are designated as St. Louis & San Francisco

trains, it being argued that it is necessary to thus establish the fact that the St. Louis & San Francisco, as well as the C. S., N. O. & P., is using trackage rights granted by the Illinois Central.

The Sherman Law and Foreign Commerce.

The United States Circuit Court of Appeals has handed down a decision in the case of the Thomsen Steamship Co. et al., vs. Union Castle Mail Steamship Co., the Prince Line, the American & African Steamship Line, et al., reversing the decision of Judge Hough in the United States district court, and ordering a new trial. The plaintiffs brought action under the Sherman statute alleging that the Union Castle Mail Steamship Co., and the other defendants—called the South African shipping ring—gave rebates to so-called "loyal shippers." The defendants charged a certain price for shipments of merchandise to South Africa, and then returned a certain per cent. of this price on condition that the shipper did business with no lines outside of the "ring." The district court held that the Sherman law did not apply in cases where the combination in restraint of trade was formed outside of the United States. This decision is overruled by the circuit court, and the case now goes to trial on its merits. The circuit court holds that if the combination in restraint of trade affects American foreign commerce, it properly comes under the provisions of the Sherman law.

Traffic News.

The Chicago, Milwaukee & St. Paul now runs regular passenger trains to and from Butte, Mont.

A meeting of the Southwestern Passenger Bureau will be held in St. Louis on October 14, at which a proposition to discontinue carrying merchandise or sample cases as baggage will be considered.

The chairman of the Uniform Classification Committee is F. S. Holbrook, who was general freight agent of the New York, New Haven & Hartford. The office of the committee is in Room 1008, Merchants' Loan & Trust Building, Chicago.

In a special report by the president of the Canadian Pacific, he said that during the last six years the company had spent \$37,000,000 for locomotives and cars, and yet during the next six weeks there would hardly be enough cars to handle the business offered.

The Oregon Short Line during the season of 1908 carried 6,002 passengers through the western entrance of Yellowstone Park. The total number of persons using the western entrance in 1907 was 2,540, so that the increase in 1908 over 1907 was 3,462 passengers.

The Wells-Fargo Express announces that it will apply to the courts for an injunction against the order of the Interstate Commerce Commission fixing rates for the transportation of express matter in consolidated shipments from San Francisco to New York.

The Austin correspondent of the Houston (Tex.) *Post* states upon the highest authority, that of the executive himself, that Governor Campbell, of Texas, will recommend to the legislature of that state the passage of a law reducing passenger fares throughout the state from 3 to 2½ cents a mile.

The Canadian Pacific has filed with the Interstate Commerce Commission tariffs from eastern United States points showing rates on cotton piece goods to points in Asia, with the rates for railroad and ocean carriage separated. This would seem to indicate that the Canadian Pacific intends to secure some of the traffic which the trans-continental roads of the United States have given up, because they do not wish to publish tariffs showing the separate proportions of the through rates.

By the compromise which is the basis of the new arrangement between the New York, New Haven & Hartford and its western connections, in regard to freight to and from points west of New York City, coal eastward and miscellaneous

freight westward will be sent by way of the Poughkeepsie bridge; while other miscellaneous business will be transferred across New York harbor. It is estimated that by this arrangement 60 per cent. of the New England traffic originating on the Central of New Jersey and the Reading will go by way of Poughkeepsie.

The Interstate Commerce Commission has informed the merchants of Augusta, Ga., that it cannot suspend the tariffs under which demurrage has to be paid on freight cars in that city. The commission had been requested to relieve the people of Augusta from this burden on account of the great flood which occurred there recently. Commissioner Clements, who writes the letter, says that possibly some relief might be granted on complete and full hearing, as in the case of rates claimed to be unreasonable or unjust.

The Queen & Crescent Despatch is a new fast freight line operating over the Cincinnati, New Orleans & Texas Pacific, the Alabama & Vicksburg, the Alabama Great Southern, the New Orleans & Northeastern, the Vicksburg, Shreveport & Pacific, and the St. Louis-Louisville lines of the Southern. Its service began on October 1. The line solicits freight between Cincinnati and Louisville, and points north and east thereof, including Chicago and St. Louis, and New Orleans, Shreveport, Vicksburg, Jackson, and other points in Louisiana, Mississippi, Texas, Arizona, New Mexico, Old Mexico, Cuba and the West Indies. The officers of this line were mentioned in the *Railroad Age Gazette*, October 2, page 1074.

The Northern Pacific, the Great Northern and the Union Pacific brought suit in the federal court at St. Paul October 1 to test the legality of the orders of the Interstate Commerce Commission in the Northwestern lumber rate cases. The cases are Pacific Coast Lumber Manufacturers' Association et al. v. Northern Pacific; Oregon & Washington Lumber Manufacturers' Association et al. v. Union Pacific et al., and allied cases, involving rates from the Northwest to western and central territory. The roads attack the findings of the Commission upon the ground that the rates which the roads put into effect on November 1, 1907, were not shown to be unreasonably high and that the rates fixed by the Commission are not reasonably compensatory. (See *Railroad Age Gazette*, July 17, 1908, p. 509, and July 31, p. 640.)

The Interstate Commerce Commission gave a hearing at St. Louis last week on the complaint of the Railroad Commission of Texas against the advance in interstate freight rates to Texas points. The Chicago Association of Commerce, the Traffic Bureau of the Merchants' Exchange of St. Louis, the Fort Worth Freight Bureau and other commercial bodies put witnesses on the stand to give reason why higher freight rates should not be charged. H. C. Barlow, executive director of the Chicago Association of Commerce, said that an advance would fall upon the manufacturers and merchants, as it would be impossible to transfer it to consumers. He said that the earnings of the Texas roads were better in the year ended June 30, 1908, than they were in the year ended June 30, 1903, and that since 1887 rates from Chicago to Texas points have been steadily advanced, while rates to other points have been reduced. He said that unless rates were maintained on a fair and even basis, industrial centers in the middle west would be unable to continue to do business in Texas. F. A. Leland, chairman of the Southwestern Traffic Committee, was one of the principal witnesses for the railroads. He said the rates were advanced to enable the roads to meet their operating expenses, pay reasonable profits and improve their facilities. C. C. Haile, vice-president and traffic manager of the Missouri, Kansas & Texas, in testifying, said that rates would probably be advanced on all lines in the West. An increase in the rates, he said, was necessary to save the roads from bankruptcy.

Fifty-five railroads filed petitions in the United States Circuit Court at St. Louis on September 29 for injunctions to restrain the Interstate Commerce Commission from enforcing its order requiring freight rates on live stock to be reduced from Texas, Oklahoma, New Mexico and Kansas to Chicago, Kansas City, Omaha, St. Joseph, St. Louis and New Orleans, and from the states mentioned to points in Colorado, Utah, Wyoming and Montana. The order of the Commission in this case, which was one of the cases brought by the Texas Cattle Raisers' Association against the western and

southwestern roads, will go into effect on October 15 unless the interlocutory order sought is issued. The railroads allege in their petitions that the rates fixed by the Commission are confiscatory and will cause them a loss of over \$1,000,000 annually. It is declared that the cattle rates charged in earlier years from the southwestern states were unreasonably low owing to peculiar competitive conditions then existing. The rates charged even now, it is asserted, are insufficient to contribute in due proportion to the cost of transportation. Damage claims alone on cattle for a period of four years absorbed 4.11 per cent. of the gross receipts on live stock. The petition also refers to the Commission's order for a reduction from \$2 to \$1 of the terminal charge for switching live stock at Chicago. The roads complain that in the face of a temporary order issued by the federal court for the district of Minnesota on June 30, 1908, restraining the Commission from lowering the terminal charge, the Commission on August 28, 1908, issued an order reducing it.

Condition of the Cotton Crop.

The crop reporting board of the United States department of agriculture finds that the average condition of the cotton crop on September 25 was 69.7 per cent. of a normal, as compared with 76.1 on August 25, 1908; 67.7 on September 25, 1907; 71.6 on September 25, 1906, and 67.6 the average of the past ten years on September 25. Comparisons by states are shown in the accompanying table:

| States. | Per cent. of U.S. acreage in states. | Per cent. | | 10-year average | |
|----------------------|---|--------------------|-------------------|-------------------|--------------------|
| | | Sept. 25, 1908. | Aug. 25, 1908. | Aug. 25, 1908. | Sept. 25, 1908. |
| United States | 100 | 69.7 | 76.1 | 73.9 | 67.6 |
| Alabama | 11 | 78 | 87 | 81 | 76 |
| Virginia | 5 | 69 | 76 | 77 | 71 |
| North Carolina | 8 | 68 | 77 | 76 | 70 |
| South Carolina | 15 | 71 | 76 | 76 | 71 |
| Georgia | 1 | 72 | 80 | 77 | 70 |
| Florida | 11 | 70 | 77 | 74 | 68 |
| Alabama | 10 | 70 | 79 | 77 | 68 |
| Mississippi | 5 | 55 | 63 | 75 | 68 |
| Louisiana | 30 | 71 | 75 | 69 | 63 |
| Texas | 6 | 70 | 83 | 74 | 68 |
| Arkansas | 2 | 78 | 88 | 82 | 74 |
| Tennessee | .. | 70 | 90 | 81 | 76 |
| Missouri | 7 | 70 | 70 | 77 | 70 |
| Oklahoma | | | | | 238 |

Federal Court Sustains Rate Making Power of Interstate Commerce Commission.

At San Francisco Sept. 30, the United States Circuit Court sustained the demurrer entered by the Interstate Commerce Commission to the Southern Pacific's application for an injunction to prevent the enforcement of the commission's freight rate on lumber from the Willamette Valley to San Francisco. This decision upholds the constitutionality of the Interstate Commerce act in that it sustains the right of the commission to fix rates for the future and protects the commission from a judicial review of its action unless a complaining carrier makes allegations which go beyond the charge that a rate is unjust or unreasonable.

The rate in question, on rough green lumber was formerly \$3.10. On Nov. 1, 1907, the roads advanced it to \$5. The commission ordered it reduced to \$3.40. The court sustained the demurrer on the ground that the railroad's bill did not allege any fraud or any misconception of law in the Commission's action in reducing the rate, and that the allegations of the bill as to the unreasonableness of the Commission's rate were too general, in view of the fact that the opinion of the Commission was filed with the bill and contained statements of fact which the court regarded as calling for a greater particularity of statement in the bill. The Southern Pacific filed an amended bill setting forth the facts in greater detail and charging that the Commission had misconceived the law in assuming the power to compel a railroad to meet water competition and to force the carrier to accept an unreasonably low rate because it had put such rate into effect years before for the purpose of developing the lumber industry in the Willamette valley. The railroad company further contended that it was entitled to a judicial review of the action of the Commission by the plain language of the law itself, and that unless such judicial review be accorded

Report of Earnings and Expenses of Railroads.

SUMMARY FOR JUNE AND JULY, 1908.

| Name of road. | Mileage operated at end of month. | Operating revenues | | | Maintenance of way and structures, equipment | | Operating expenses | | General. | Total. | Net operating revenues (or deficit). | Outside operations. | Taxes. | Operating income (or loss). | Increase (or decrease) July, '07. |
|--|-----------------------------------|--------------------|------------|-------------|--|-------------------|--------------------|-------------------|-----------|-------------|--------------------------------------|---------------------|-----------|-----------------------------|-----------------------------------|
| | | Freight. | Passenger. | Total. | Inc. misc. | Trans. portation. | Traffic. | Trans. portation. | | | | | | | |
| Summary of 760 Reports filed for June, 1908. | 224,914 | 119,594,901 | 44,198,648 | 173,482,505 | 797,778 | 62,354,090 | 3,982,055 | 62,354,090 | 4,600,297 | 121,032,004 | 58,400,501 | ..... | 7,551,332 | 50,849,169 | ..... |
| Average per mile of line | ..... | 531.74 | 196.11 | 727.85 | 3.53 | 277.23 | 17.70 | 277.23 | 20.45 | 538.12 | 259.66 | ..... | 33.57 | 226.09 | ..... |
| Ratio, per cent. | ..... | 66.65 | 24.58 | 100.00 | ..... | 37.75 | 2.22 | 37.75 | 2.56 | 67.45 | 32.55 | ..... | 4.21 | 28.34 | ..... |
| Summary of 581 Reports filed for July, 1908. | 195,585 | 109,533,902 | 43,783,862 | 153,317,764 | 847,322 | 53,860,166 | 3,245,127 | 53,860,166 | 4,239,646 | 106,921,990 | 58,800,660 | ..... | 5,886,636 | 53,548,733 | ..... |
| Average per mile of line | ..... | 560.03 | 223.86 | 783.89 | 4.33 | 275.38 | 16.59 | 275.38 | 21.68 | 546.68 | 300.64 | ..... | 30.10 | 273.78 | ..... |
| Ratio, per cent. | ..... | 66.10 | 26.42 | 100.00 | ..... | 32.50 | 1.96 | 32.50 | 2.56 | 64.52 | 35.48 | ..... | ..... | ..... | ..... |
| MONTH OF JULY, 1908. | | | | | | | | | | | | | | | |
| Atlanta & Birmingham Air Line. | 237 | 41,019 | 24,500 | 70,237 | 12,784 | 27,767 | 1,274 | 27,767 | 2,655 | 49,250 | 20,987 | ..... | 4,813 | 16,174 | 11,853 |
| Baltimore & Ohio | 3,992 | 2,677,312 | 1,132,554 | 5,222,105 | 782,700 | 1,915,019 | 144,121 | 1,915,019 | 119,093 | 3,698,049 | 2,024,056 | ..... | 165,222 | 1,804,512 | 1,330,747 |
| Buffalo, Rochester & Pittsburgh | 568 | 526,806 | 32,003 | 653,571 | 79,936 | 179,815 | 9,011 | 179,815 | 13,120 | 450,343 | 203,252 | ..... | 15,000 | 188,032 | 114,433 |
| Central New England | 298 | 110,604 | 31,873 | 153,476 | 34,919 | 59,930 | 1,349 | 59,930 | 2,526 | 117,853 | 35,653 | ..... | 5,600 | 30,053 | 15,819 |
| Chicago Great Western | 818 | 383,293 | 174,819 | 613,762 | 81,347 | 183,330 | 35,062 | 183,330 | 33,924 | 499,979 | 113,783 | ..... | 17,000 | 96,783 | 41,799 |
| Cincinnati, Hamilton & Dayton | 1,036 | 453,293 | 153,882 | 654,902 | 84,099 | 231,592 | 23,837 | 231,592 | 21,210 | 531,939 | 122,963 | ..... | 25,000 | 100,762 | 26,312 |
| Cleveland, Lorain & Wheeling | 194 | 380,253 | 121,003 | 427,451 | 38,174 | 61,523 | 6,604 | 61,523 | 5,768 | 242,511 | 184,940 | ..... | 9,406 | 175,534 | 32,128 |
| Cleveland Terminal & Valley | 93 | 58,560 | 16,963 | 80,711 | 12,914 | 8,145 | 1,649 | 8,145 | 1,627 | 202,781 | 21,895 | ..... | 3,358 | 18,537 | 4,397 |
| Georgia | 307 | 139,392 | 65,729 | 218,074 | 54,602 | 37,455 | 7,870 | 37,455 | 6,344 | 96,510 | 15,293 | ..... | 1,625 | 13,668 | 4,260 |
| Gila Valley, Globe & Northern | 125 | 94,417 | 10,994 | 67,948 | 10,374 | 6,350 | 403 | 6,350 | 1,458 | 34,615 | 33,333 | ..... | 2,000 | 31,333 | 35,229 |
| Green Bay & Western | 225 | 94,417 | 10,994 | 67,948 | 10,374 | 6,350 | 403 | 6,350 | 1,458 | 34,615 | 33,333 | ..... | 2,000 | 31,333 | 35,229 |
| Houston, East & West Texas | 191 | 64,513 | 12,815 | 92,387 | 13,997 | 12,854 | 330 | 12,854 | 1,452 | 33,102 | 11,644 | ..... | 1,846 | 9,798 | 4,776 |
| Houston & Texas Central | 789 | 303,531 | 125,935 | 439,829 | 53,252 | 61,223 | 1,424 | 61,223 | 1,176 | 34,948 | 11,401 | ..... | 5,000 | 30,291 | 4,631 |
| Illinois Central | 4,509 | 2,544,351 | 951,739 | 3,990,455 | 622,777 | 887,695 | 95,441 | 887,695 | 94,205 | 3,181,396 | 809,059 | ..... | 182,608 | 626,897 | 338,484 |
| Indianapolis Southern | 179 | 22,812 | 12,146 | 34,958 | 23,007 | 6,172 | 1,402 | 6,172 | 2,590 | 34,419 | 16,845 | ..... | 2,301 | 14,454 | 13,309 |
| International Ry. of Maine | 233 | 163,092 | 28,737 | 212,146 | 32,827 | 46,003 | 2,114 | 46,003 | 2,744 | 137,325 | 64,582 | ..... | 5,000 | 8,143 | 16,376 |
| Kanawha & Michigan | 177 | 163,092 | 28,737 | 212,146 | 32,827 | 46,003 | 2,114 | 46,003 | 2,744 | 137,325 | 64,582 | ..... | 5,000 | 8,143 | 16,376 |
| Lehigh Valley | 1,446 | 2,029,313 | 416,088 | 2,826,451 | 289,391 | 463,619 | 63,153 | 463,619 | 52,884 | 1,649,255 | 877,196 | ..... | 85,600 | 762,760 | 316,719 |
| Louisiana & Arkansas | 298 | 72,413 | 14,821 | 87,234 | 18,117 | 17,814 | 1,572 | 17,814 | 4,320 | 71,406 | 26,975 | ..... | 1,400 | 25,576 | 20,192 |
| Louisiana Western | 198 | 90,445 | 43,523 | 133,968 | 13,419 | 12,384 | 5,124 | 12,384 | 2,082 | 494,568 | 227,741 | ..... | 3,622 | 49,414 | 96,943 |
| Maine Central | 931 | 361,962 | 312,945 | 1,227,309 | 131,489 | 84,373 | 8,535 | 84,373 | 1,723 | 95,979 | 12,448 | ..... | 1,870 | 10,378 | 3,639 |
| Mason City & Fort Dodge | 137 | 93,604 | 42,397 | 147,580 | 19,273 | 18,424 | 1,649 | 18,424 | 8,373 | 72,723 | 34,808 | ..... | 1,220 | 58,660 | 37,493 |
| Minnesota & International | 177 | 30,535 | 10,516 | 40,533 | 13,851 | 13,832 | 1,272 | 13,832 | 1,176 | 52,781 | 23,880 | ..... | 2,831 | 21,977 | 2,336 |
| Mobile, Jackson & Kansas City | 402 | 70,322 | 25,316 | 104,533 | 20,737 | 14,669 | 1,195 | 14,669 | 1,176 | 52,781 | 23,880 | ..... | 1,220 | 58,660 | 37,493 |
| Montana | 351 | 199,394 | 11,090 | 210,484 | 15,824 | 4,169 | 1,195 | 4,169 | 1,176 | 52,781 | 23,880 | ..... | 1,220 | 58,660 | 37,493 |
| Morgan's L. & Tex. R. & S. S. Co. | 331 | 44,667 | 21,719 | 66,386 | 10,407 | 46,221 | 9,271 | 46,221 | 11,899 | 230,534 | 68,987 | ..... | 849 | 14,900 | 17,385 |
| Nevada & California | 331 | 44,667 | 21,719 | 66,386 | 10,407 | 46,221 | 9,271 | 46,221 | 11,899 | 230,534 | 68,987 | ..... | 849 | 14,900 | 17,385 |
| New York, New Haven & Hartford | 2,004 | 2,033,322 | 1,981,177 | 4,014,522 | 565,802 | 417,846 | 20,006 | 417,846 | 83,370 | 2,906,911 | 1,494,911 | ..... | 278,000 | 1,310,257 | 198,202 |
| Oregon R. & Nav. Co. | 1,924 | 743,357 | 339,001 | 1,153,358 | 157,388 | 67,378 | 21,745 | 67,378 | 27,933 | 550,469 | 593,269 | ..... | 42,169 | 554,386 | 14,121 |
| Oregon Short Line | 1,455 | 1,016,686 | 306,151 | 1,552,398 | 146,409 | 104,778 | 21,341 | 104,778 | 27,150 | 617,975 | 934,423 | ..... | 87 | 48,083 | 886,427 |
| Pere Marquette | 2,360 | 616,668 | 368,705 | 1,057,216 | 143,898 | 178,384 | 29,480 | 178,384 | 27,667 | 809,396 | 247,820 | ..... | 1,040 | 196,504 | 168,707 |
| Pittsburgh, Shawmut & Northern | 238 | 51,358 | 3,438 | 54,796 | 13,430 | 28,988 | 875 | 28,988 | 3,121 | 68,464 | 42,087 | ..... | 1,556 | 7,481 | 11,232 |
| St. Joseph & Grand Island | 319 | 81,230 | 33,812 | 115,042 | 13,516 | 13,516 | 5,243 | 13,516 | 3,913 | 82,097 | 42,087 | ..... | 6,772 | 35,926 | 21,518 |
| Southern Indiana | 351 | 83,658 | 16,367 | 100,025 | 23,423 | 32,328 | 2,078 | 32,328 | 11,497 | 92,986 | 3,944 | ..... | 2,518 | 39,703 | 103,591 |
| Southern Pacific—Pacific System | 5,376 | 3,966,513 | 2,423,129 | 6,828,530 | 812,669 | 677,026 | 101,298 | 677,026 | 198,760 | 3,513,217 | 3,315,113 | ..... | 214,607 | 3,139,987 | 103,591 |
| Southern Pacific—Atlantic S. S. Lines | None | 391,498 | 55,563 | 431,539 | 58,672 | 5,737 | 120,080 | 5,737 | 4,626 | 418,932 | 32,447 | ..... | 4,736 | 184,137 | 2,422 |
| Toledo & Ohio Central | 104 | 370,499 | 18,638 | 389,137 | 18,754 | 9,559 | 1,669 | 9,559 | 6,912 | 247,756 | 190,796 | ..... | 38 | 17,966 | 71,950 |
| Tonopah & Goldfield | 129 | 61,978 | 18,638 | 80,616 | 13,453 | 8,928 | 1,643 | 8,928 | 2,188 | 62,586 | 22,519 | ..... | 3,000 | 52,937 | 6,489 |
| Union Pacific | 3,301 | 2,638,814 | 952,358 | 3,912,833 | 499,124 | 392,320 | 75,691 | 392,320 | 97,137 | 1,884,090 | 2,028,743 | ..... | 1,480 | 1,922,561 | 257,042 |
| Washington County | 139 | 39,994 | 16,775 | 56,769 | 13,306 | 4,156 | 288 | 4,156 | 668 | 31,242 | 8,715 | ..... | 2,094 | 8,569 | 16,579 |
| Washington, Minnesota & Pacific | 271 | 30,704 | 17,209 | 47,913 | 12,146 | 7,160 | 280 | 7,160 | 280 | 39,241 | 13,115 | ..... | 2,094 | 11,021 | 32,350 |
| Yazoo & Mississippi Valley | 1,371 | 348,275 | 166,531 | 514,806 | 191,747 | 112,062 | 16,497 | 112,062 | 23,627 | 636,438 | 82,009 | ..... | 2,778 | 34,590 | 113,821 |
| MONTH OF AUGUST, 1908. | | | | | | | | | | | | | | | |
| Atlantic Coast Line | 4,406 | 1,027,671 | 427,097 | 1,575,574 | 285,160 | 270,996 | 30,618 | 270,996 | 53,878 | 1,266,808 | 308,766 | ..... | 90,000 | 218,766 | 16,400 |
| Buffalo & Susquehanna | 372 | 153,657 | 21,775 | 181,604 | 34,278 | 35,151 | 3,849 | 35,151 | 9,789 | 142,005 | 30,505 | ..... | 4,000 | 35,446 | 33,011 |
| Charleston & Western Carolina | 340 | 4,298,347 | 2,060,762 | 6,938,606 | 20,071 | 1,116,925 | 135,083 | 1,116,925 | 9,789 | 4,357,123 | 2,483,472 | ..... | 4,100 | 2,271,431 | 3,047,674 |
| Chicago, Burlington & Quincy | 9,924 | 8,206,419 | 1,674,928 | 13,189,767 | 2,094,732 | 2,105,925 | 265,722 | 2,105,925 | 3,871,322 | 8,772,297 | 4,517,297 | ..... | 1,618 | 4,990,209 | 1,780,079 |
| El Paso & Southern Railway | 867 | 842,494 | 167,528 | 1,039,710 | 150,698 | 162,471 | 18,782 | 162,471 | 41,742 | 646,508 | 413,292 | ..... | 22,373 | 390,829 | 21,545 |
| Louisville & Nashville | 4,365 | 5,075,525 | 1,834,282 | 7,309,008 | 901,129 | 1,222,842 | 166,932 | 1,222,842 | 1,554,609 | 2,526,792 | 2,526,792 | ..... | 11,365 | 2,290,752 | 21,545 |
| Norfolk & Western | 1,920 | 4,076,508 | 645,689 | 4,736,922 | 548,996 | 802,623 | 73,375 | 802,623 | 98,554 | 2,892,085 | 1,984,837 | ..... | 3,601 | 1,806,036 | 284,065 |
| Virginia & Southwestern | 183 | 157,452 | 28,198 | 193,358 | 23,544 | 30,482 | 1,961 | 30,482 | 6,518 | 112,751 | 80,697 | ..... | 7,151 | 73,456 | 22,851 |

* Deficit. † Loss. ‡ Decrease.

to the company it will be deprived of a judicial examination into the reasonableness of charges for services.

Interstate Commerce Commissioner Lane is quoted as offering the following comment on this decision: "The commission, after a full hearing, made an order reducing the rate on rough lumber from the Willamette valley to San Francisco. The Southern Pacific asked for an injunction. The court has refused to grant such an injunction, and in so doing has specifically upheld the constitutional power of the commission to make an order establishing rates, and has declared it to be the law that a Court of Equity will not set aside an order of this commission establishing a rate, excepting where it can be alleged and proved that such an order is in contravention of the constitutional rights of the carrier.

"The theory of the court is, as I judge from the incomplete reports which I have seen, that the discretion vested in the commission as to what a reasonable rate shall be, will not be interfered with by the courts, excepting where it can be clearly shown that the commission has acted arbitrarily or has in effect confiscated the property of the carrier. The courts will not set up their judgment as against that of an administrative body in which has been reposed the exercise of a legal discretion. This is not new law, it is the enunciation and application of a very well known and old established principle. One of the latest and clearest expressions of this doctrine is to be found in what is known as the Tift lumber case recently decided in favor of the commission by the Supreme Court of the United States, the opinion being written by Justice McKenna.

"The Circuit Court of Appeals for the ninth judicial circuit is composed of Judges Ross, Gilbert and Morrow, and is regarded as one of the most conservative of our Federal Courts." * * *

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The State Railways of Roumania are asking bids in the United States for 21 locomotives.

The Chicago River & Indiana has ordered two locomotives from the American Locomotive Co.

Galbon & Co., Havana, Cuba, have ordered one locomotive from the Baldwin Locomotive Works.

The Michigan Central has ordered one compound locomotive from the Baldwin Locomotive Works.

The Ozark Land & Lumber Co., Winona, Mo., has ordered one locomotive from the Baldwin Locomotive Works.

The Italian State Railways have ordered 36 locomotives from Gio. Ansaldo Armstrong & Co., Sampierdarena, Italy.

The Green Bay & Western has ordered one consolidation locomotive from the Schenectady works of the American Locomotive Co.

The Denver & Rio Grande has ordered five locomotives from the American Locomotive Co. This order is in addition to the 25 reported in the *Railroad Age Gazette* of September 25.

CAR BUILDING.

The Pennsylvania is asking prices on 44 steel coaches and a number of postal cars.

The Illinois Tunnel Co., Chicago, has ordered 750 steel tram cars from the Bettendorf Axle Co.

The Harriman Lines have ordered 200 steel and 20 wooden passenger cars from the Pullman Co.

The Chicago & Alton has ordered 1,000 additional 50-ton steel coal cars from the Standard Steel Car Co.

The Washington Water Power Co., Spokane, Wash., is asking prices on 20 city and seven closed interurban cars.

The Missouri & Kansas Interurban has ordered three combination passenger and smoking interurban cars from the American Car Co.

The Marcellus & Otisco Lake is considering the use of gasoline motor cars for passenger and postal service.

The Dennison & Sherman is said to be in the market for four electric cars. This item is not yet confirmed.

The Fort Scott Gas & Electric Co. is said to be in the market for one electric car. This item is not yet confirmed.

The Union Traction Co. of Kansas has ordered one electric car from the American Car Co. for November delivery.

The Booth-Kelly Lumber Co., Eugene, Ore., is in the market for 25 forty-ton logging cars. The bids are being received by E. R. & R. G. Hutchins, Great Northern building, Chicago.

The City of Edmonton, Alberta, Can., as reported in the *Railroad Age Gazette* of August 28, has ordered seven semi-convertible electric cars from the Ottawa Car Co., Ltd. These cars will have a seating capacity of 40 passengers. The bodies will weigh 20,000 lbs. The cars will be 27 ft. 4 in. long, 7 ft. 4 in. wide and 8 ft. 2 in. high, inside measurements, and 39 ft. long, 8 ft. 2 in. wide and 11 ft. 4 in. high, over all. The bodies will be of wood and the underframes of wood and steel.

The Columbia & Puget Sound, as reported in the *Railroad Age Gazette* of September 25, has ordered three passenger coaches and one combination baggage and passenger car from Harlan & Hollingsworth. These cars will be 55 ft. 2 in. long, inside measurements, and 56 ft. long, 9 ft. 8 in. wide and 13 ft. 9 1/4 in. wide, over all. The bodies and underframes will be of wood. The special equipment will include:

| | |
|------------------|----------------|
| Bolsters, body | Iron |
| Brakes | Westinghouse |
| Brake-beams | Monarch |
| Couplers | Tower |
| Curtain fixtures | Forsythe |
| Curtain material | Pantasote |
| Heating system | Spear stoves |
| Lighting system | Oil lamps |
| Paint | Pullman color |
| Platform | Standard Steel |
| Roofs | Th |
| Seat covering | Plush |
| Wheels | Paige |

IRON AND STEEL.

The Southern Pine Joint Co., Courtiche, India, has ordered 9,000 tons of 80-lb. rails from the Dominion Steel & Iron Co., Sydney, Nova Scotia.

The Grand Trunk Pacific has ordered 28,695 tons of rails from the Dominion Iron & Steel Co., and 15,752 tons from the Algoma Steel Co.

RAILROAD STRUCTURES.

CINCINNATI, OHIO.—Bids will be received by the Cincinnati Southern until October 12 for the construction of the superstructure of a viaduct for its terminal track from Eighth street and McLean avenue to Third and Front streets. (June 28, p. 948.)

EDMONTON, ALB.—The Grand Trunk Pacific and Canadian Northern will jointly put up a union passenger station here.

GRIDER, TEX.—The Estacado & Gulf shops are to be located here. See this company under Railroad Construction.

NORTH BAY, ONT.—The Canadian Pacific roundhouse at this place and two locomotives were recently destroyed by fire.

SEATTLE, WASH.—The Northern Pacific has submitted plans to the Board of Public Works of Seattle for an overhead steel crossing over the company's switch yards at Holgate street.

SUPPLY TRADE NOTES.

Louis M. Henoeh, Secretary of Joseph T. Ryerson & Son, Chicago, has resigned. Mr. Henoeh has been with this company since 1888, serving in recent years as General Sales Manager and Secretary, in charge of sales, purchases and operation.

C. R. Robinson, heretofore Sales Agent for the Inland Steel Company, Chicago, has resigned to become District Sales Agent of the Lackawanna Steel Co., New York, with offices in the Commercial National Bank building, Chicago, rooms 1726-1728.

The American Car & Equipment Co., Chicago, has received several orders from trunk line railroads for repairing and rebuilding freight cars. The shops of the company at Chicago Heights will be kept very busy for some time in fulfilling these contracts.

F. A. Barbey, New England Agent of Thomas Prosser & Son, New York, the Rostand Manufacturing Co., Milford, Conn., and the Frost Railway Supply Co., Detroit, Mich., and a number of other railroad supply houses, has moved his office from 185 Summer street to Room No. 230 South Terminal Station, Boston.

The Isthmian Canal Commission, General Purchasing Officer, Washington, D. C., asks bids (Circular No. 472) up to October 26 on a piston pump, plate straightening machine, 2½-k.w. generating units, miscellaneous electric apparatus, pig iron, babbitt metal, brass, copper, tubing, chain, cable, wire, belting, hammers, saws, drills and other tools, ball bearings, screws, paint, varnish, various chemicals, ties and other lumber.

The Bucyrus Co., South Milwaukee, Wis., has just completed three large dredges for the Stewart-Kerbaugh-Shanley Co., for use on that company's New York state barge canal contract at Brewerton. There are two elevator dredges, with belt conveyor systems for spoil disposal, and one hydraulic dredge. Contracts have also been received from the Empire Engineering Co., Berlin, N. Y., for two more elevator dredges, with a series of belt conveyors for spoil disposal, to be used on its new contracts on the barge canal.

The Cement Products Exhibition Co., Commercial Bank building, Chicago, is now completing arrangements for the second annual cement show to be held in Chicago from February 18 to 24. Diagrams have been prepared showing the division of space and are being distributed among prospective exhibitors. The company has received a large number of applications for space, and it is expected that two-thirds of the 250 exhibits that can be accommodated will be provided for on the first allotment. C. H. Wood is Secretary.

H. F. Glenn, Consulting Engineer of the Eastern division of the American Car & Foundry Co., New York, died at his home in Berwick, Pa., on September 11. He was born at Holmesburg in 1848, and educated in the Central High School of Philadelphia. In 1870 he entered the employ of the Jackson & Woodin Car Manufacturing Co. at Berwick, Pa., and held successively the positions of clerk, Superintendent of Rolling Mill, Treasurer, Secretary, General Superintendent and General Manager. Upon the formation of the American Car & Foundry Co. in 1899, he became Assistant District Manager of the Berwick plant, and later was made Consulting Engineer.

Robert J. Gross, Vice-President in charge of the domestic and foreign sales of the American Locomotive Company, New York, has resigned to devote his time to other interests. Mr. Gross is President of the U. S. Radiator Co., Dunkirk, N. Y., President of the Merchants' National Bank of the same place, and Chairman of the Board of the American Lux Light Co., the main office of which is in Stockholm, Sweden. Mr. Gross is also identified with other enterprises. He will remain with the American Locomotive Co. as a Director. Mr. Gross was born in Brighton, Canada, in 1850. As a lad he was a telegrapher, and at the age of 19 was a train despatcher on the Erie in Buffalo and Dunkirk. Four years later he became Chief Train Despatcher of the Denver & Rio Grande at Pueblo, Colo., and was later made Superintendent of Transportation, holding that position until 1881, when he returned to the Erie. The year following, Mr. Gross was made assistant to Horatio G. Brooks, founder of the Brooks Locomotive Works, and in 1892 he was elected Vice-President, in which capacity he served until 1901. When the American Locomotive Co. was formed, June, 1901, Mr. Gross was elected Second Vice-President, with office at Dunkirk. In February, 1906, he was elected to the position he has just resigned.

TRADE PUBLICATIONS.

Boiler Tubes.—A catalogue of the Parkesburg Iron Co., Parkesburg, Pa., contains useful information regarding charcoal iron skelp and boiler tubes.

Expanded Metal.—Northwestern expanded metal is the subject of a small pamphlet just issued by the Northwestern Expanded Metal Co., Chicago, giving the uses of the material, its construction, standard sizes and formulae for reinforced concrete design.

Cranes.—A leaflet of the Sprague Electric Co., New York, contains several illustrations of hoists, grab buckets and monorail cranes, also an illustration of an installation of a grab bucket monorail crane for use in handling coal and ashes at a power station.

Motors.—Bulletin No. 59 of the Northern Electrical Manufacturing Co., Madison, Wis., contains an interesting and valuable description of Northern type S motors. Several half-tone cuts are included, also line cuts showing the direction and distribution of the lines of force in these machines.

Graphite.—The October number of this pamphlet, published by the Joseph Dixon Crucible Co., Jersey City, N. J., contains chapter VI. of the series by W. H. Wakeman on "Preventing Corrosion of Steam Machinery," also chapter II. of an article by Dudley A. Johnson on "Prolonging the Life of Crucibles."

Bearings.—The Hill Clutch Co., Cleveland, Ohio, has issued a catalogue devoted to the bearings which it manufactures for power transmission, elevating, conveying and cement machinery. The publication is well illustrated with half-tone views and detailed drawings and contains several tables of dimensions and price lists.

Steel Lockers.—The Durand Steel Locker Co., Chicago and New York, has issued an attractive catalogue illustrating and describing the Durand steel lockers. Illustrations show the various types manufactured and their adaptability to special requirements. The locking devices and invisible hinges are given considerable attention.

Thermit.—The Goldschmidt Thermit Co., New York, has just issued its periodical *Reactions*, for the third quarter of 1908. This issue, which is the third since the publication was started last spring, contains several interesting articles on welding by this method, while a large number of half-tones plainly illustrate the many uses to which thermit may be put.

Electrification.—Muralt & Co., Consulting Engineers, New York, have issued the 12th number of their monthly publication, *Electric Trunk Line Age*. This eight-page journal covers only the electrification of trunk line roads. It usually has several articles, often illustrated, dealing with particular electrifications proposed or carried out. The latest issue contains the last of a series of articles embodying an actual report on the proposed electrification of a mountain division of a trunk line, and also shorter articles on allied subjects.

Trucks.—Pamphlet No. 10,032, just issued by the American Locomotive Co., New York, illustrates and describes different designs and types of electric locomotive motor and trailer trucks, and motor trucks for interurban and street railways. These trucks are made by the American Locomotive Co. for all classes of service. Several pages in the pamphlet are devoted to specialties used, among which are the semi-steel electric truck journal boxes and the center and side bearings made by the T. H. Symington Co., Chicago, and the malleable electric truck journal boxes made by McCord & Co., New York. The pamphlet also gives a large amount of useful data on electric railway equipment, which makes it valuable as a book of reference.

Scherzer Rolling Lift Bridges.—The third edition of this publication of the Scherzer Rolling Lift Bridge Co., Chicago, just issued, is revised and enlarged. Following 60 pages of type matter setting forth the advantages of this type of bridge, comparisons with other kinds of drawbridges, testimonials regarding Scherzer bridges in service and a partial list of such bridges in operation or under construction in various parts of the world, there is an album of views of a large number

of these installations. Many of the bridges shown have been described in these columns. In the back of the volume are folded sheets of drawings of Scherzer bridges in operation or under construction as movable spans in bridges crossing wide navigable waterways.

Railway, Mill and Mining Supplies.—The Consolidated Supply Co., Manhattan building, Chicago, has issued a new loose leaf catalogue, No. 15, which illustrates and describes the supplies which it handles. Particular attention is called to the Consolidated patented metal car roof which has been under tests for the past five years and was just recently placed on the market. A new malleable tie plate, on which a patent is pending, is also handled by this company. Other features of the publication include descriptions of Monarch couplers for locomotives and cars, Reading multiple gear chain hoists, and Northern fire extinguishers. Announcement is made that the company is in a position to quote low prices on boiler and tank work, bar iron, castings, rubber goods, etc. The catalogue will be sent by the company on request.

New Experimental Motor Car.

The Tabor & Northern Railway, which runs from Tabor, Iowa, northeast to Malvern, 11 miles, has for the past four or five years been experimenting with gasoline motor passenger cars. An officer writes that a light passenger car

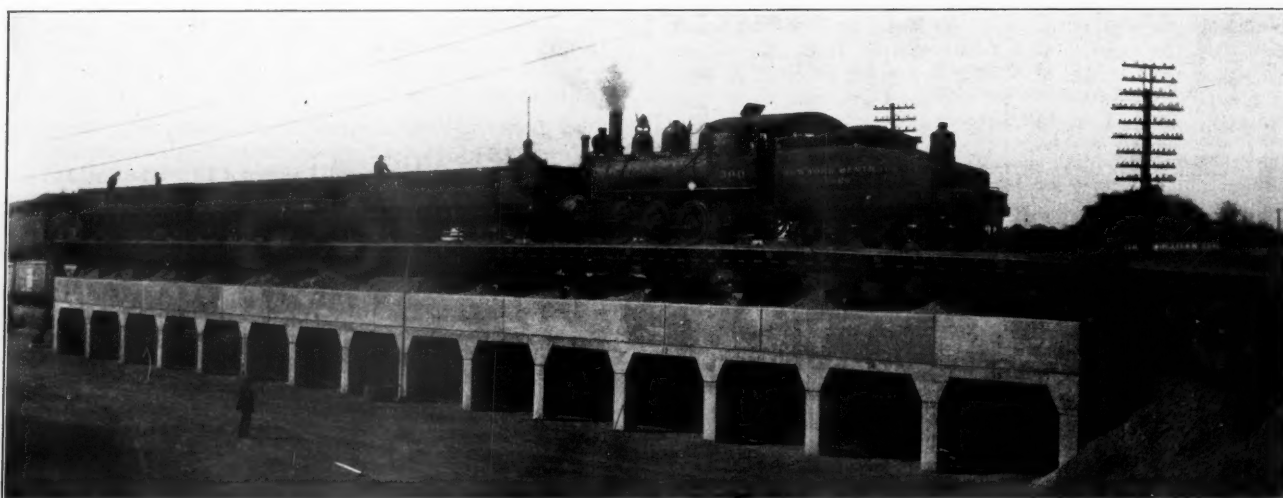
greatly to exceed what is directly attributable to the influence of the new law. It is said that nearly 2,000 patents are now within the scope of the law, and if these were all manufactured in England, 30,000 to 40,000 people would be given employment.

The law became operative August 28, 1908. Thirty foreign firms had then completed arrangements to open factories in Great Britain. Among them are a number of American firms. Many firms in the United States and in Germany have negotiations for factories or sites under way.

Reinforced Concrete Stone Bins and Trestle.

The city of Springfield, Mass., repairs its streets, which are paved largely with macadam, with its own forces and materials. It has to buy and handle a large quantity of crushed stone. To facilitate storing this material and loading it to teams, the street department awarded a contract to the Turner Construction Co., New York, for the design and erection of a trestle and stone bins by the use of which broken stone could be dumped directly from the railroad cars into bins and, by gates in the bottom of the latter, transferred to teams which could drive under the trestle. The accompanying photograph shows the completed structure.

The Boston & Albany has a connection with this trestle and runs bottom dump ballast cars out on the wooden trestle which is built on top of the concrete bins. The length of the



Trestle and Stone Bins at Springfield.

has now been completed which, it is hoped, will be satisfactory. The machine is on the road awaiting final tests before being put into regular service. The car consists of an ordinary 21-ft. street car body mounted on a single four-wheel truck which contains the motive power and transmission machinery, no space being taken up in the body except for the driver on the front platform. Power is supplied by a four-cylinder horizontal opposed gasoline motor, developing 75 to 80 h.p. It is expected to have this car ready for service within two weeks.

British Patent Law.

Consul Frank W. Mahin, of Nottingham, England, reports that the representative of a British firm making a specialty of securing factories and factory sites for applicants is quoted to the effect that many applications have been received from foreigners because of the new law requiring articles patented in the United Kingdom to be manufactured in England. An important feature of the applications already made is that the manufacturers demand works much larger than are necessary to make the patented article, giving as the reason that they cannot run works in England on the patents alone, and therefore intend to make other goods which have hitherto been imported ready-made. Consequently, the volume of new manufacturing business brought to the country is expected

concrete structure is 182 ft. The width is uniformly 15 ft. 6 in. The wooden trestle which supports the railroad track rests on concrete bents consisting of two columns 20 in. square, connected with a girder 3 ft. deep and 14 in. wide, with a clear span of 12 ft. 2 in. Connecting each bent and forming the floor of the stone bins is a 12-in. reinforced concrete slab. Extending above the top of this slab to a height of 4 ft. are two light retaining walls.

The reinforcement used in this work consists of cold-twisted bars bent and fabricated according to the regular methods of the Turner Construction Co. The girders connecting the concrete columns are reinforced with six 1-in. bars and twelve $\frac{3}{8}$ -in. stirrups. The columns have four 1-in. bars banded together at 12 in. intervals, with $\frac{1}{4}$ -in. hoops. In addition, in the tops of the columns are four $\frac{3}{4}$ -in. bars running at an angle of about 30 deg. with the vertical axis of the column, and reinforcing the knee-braces, which show in the photograph.

The footings vary somewhat in size, but in general are 8 ft. by 6 ft. and 16 in. thick, reinforced with a grillage of $\frac{3}{4}$ -in. bars. The depth below the surface is in most cases 10 ft. The foundation conditions were unusually poor, the soil being soft muck in some places, and at one end of the trestle an old sewer had to be crossed. This was taken care of by a girder-footing spanning the sewer. The trestle has been in use now about six months without any defects showing.

In constructing the trestle, the columns were filled first,

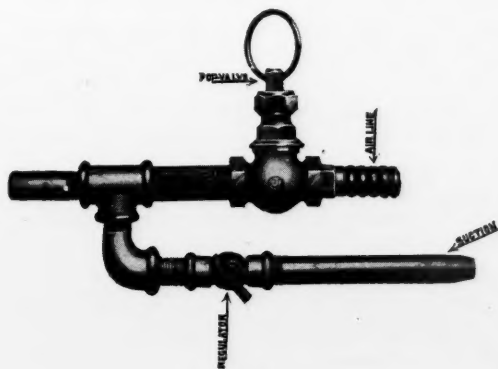
then the beams and floor slab cast together, and the retaining wall put on afterwards. The column reinforcement is bonded to the rest of the structure, to take care of the moving loads to which the structure is subjected, by reinforcing rods running up into the retaining wall.

For the form work, $\frac{7}{8}$ -in. t. & g. North Carolina roofing was used for all panels. The column forms and girder bottom and sides were made out of 2-in spruce, dressed both sides. The column brackets and all supports under the slabs and girders were of 4-in. x 4-in. spruce. For spreaders and incidental bracing, 2-in. x 6-in. and 2-in. x 8-in. spruce was used. Wherever possible, $\frac{3}{4}$ -in. bolts were used on the wall forms and column brackets.

The structure was completed in four weeks after the first excavation. The forms were removed two weeks after concreting and the railroad trestle put in place within about a month. The first locomotive was run over the trestle five months after the concrete work was finished. The maximum capacity of the stone bins is about 570 cu. yds., or about 20 carloads. The total cost of the work to the city was about \$8,000.

Sand Blast and Paint Spray.

The accompanying illustration shows the Niagara paint spray, designed as a substitute for brushes in painting. It is claimed that any unskilled laborer, with a very little instruction, can use this tool advantageously on any surface, either



Niagara Paint Spray.

wood, iron or steel and paint the surface as satisfactorily as could a skilled painter using a brush. The process of painting with this spray is said to be a very quick one and the surface is covered thoroughly and evenly. It is possible to apply either a thick or thin coat, using either paint, oil, varnish or preservatives. The regulator, seen in the illustration, provides for a certain flow and prevents any waste. No complicated apparatus is required. The pipe lines are attached to the tool as shown in the illustration, the suction pipe leading to a vessel containing the paint or other material. The $\frac{1}{2}$ -in. suction hose should not be more than 5 ft. long. Paint is drawn up and sprayed out on the atomizer principle by air pressure at from 50 to 60 lbs. passing through the air line in the tool. By placing the hand over the nozzle of the tool, the paint in the receptacle is stirred by the action of the air backing down through the suction hose. This operation will also clean the tool, in which case it is necessary to remove the suction hose from the paint.

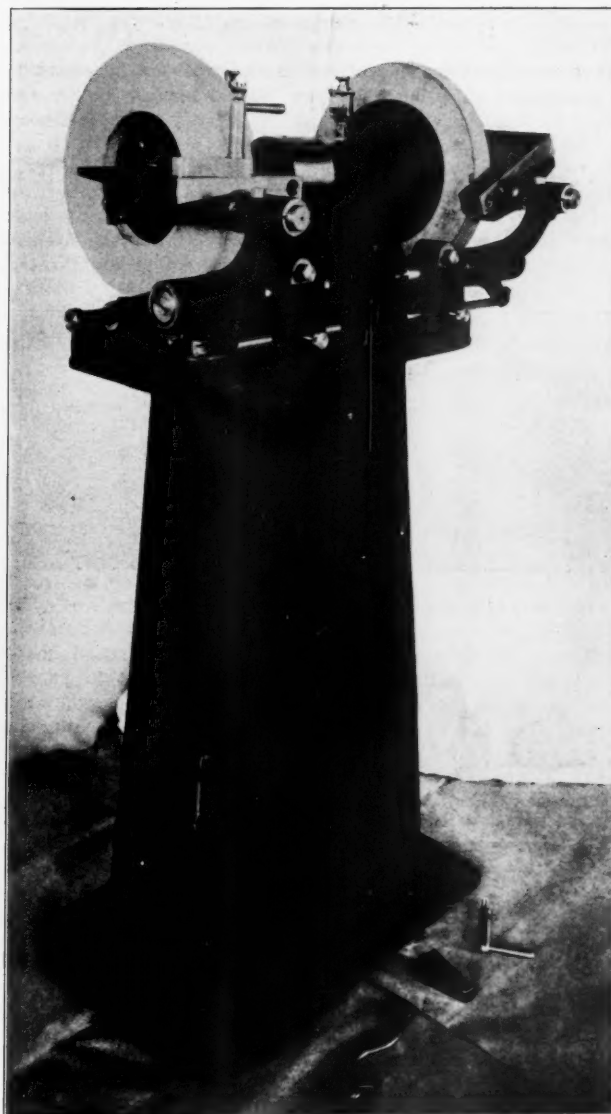
This company also makes the Niagara sand blast, which is designed for removing foreign substances from metal work by the use of an air blast of from 80 to 90 lbs. pressure. This tool is of special advantage in cleaning the sand from fresh castings in the foundry, for removing scale, rust or paint from any metal surface. Irregular surfaces are easily cleaned by the use of the sand blast, in which case it would be both difficult and expensive to clean them otherwise. The tool is similar in design to the paint spray, except that the suction line is placed at right angles with the line of the blast and there is no regulating valve. Sand of $\frac{1}{8}$ -in. screen is siphoned direct from the ground-pit, or receptacle. The device is fitted with $\frac{1}{4}$ -in. hose connections. The suction hose should not be

over 5 ft. long and light in weight, so that the tool can be held in one hand. Like the paint spray, this tool may be used by any unskilled laborer with a few minutes' instruction and practice.

These tools are now used by several large railroads, and also in steel plants, car shops, etc. They are made by the Niagara Device Co., Buffalo, N. Y.

Grinding Machine.

This machine, made by the Emmert Manufacturing Co., Waynesboro, Pa., is designed for miscellaneous small grinding jobs in machine shops and tool rooms, such as sharpening



Emmert Face Grinding Machine.

lathe and planer tools, or truing up the ends of small machine parts.

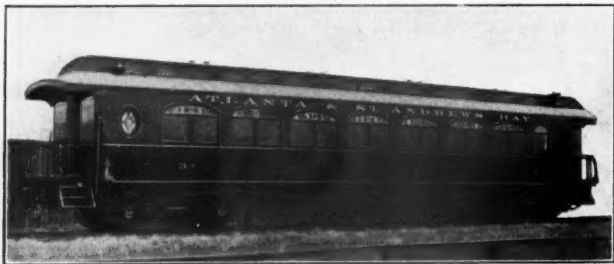
Straight edges or surfaces on tools and straight faces on the edges of work are easily obtained by using the face of the wheel rather than the periphery, if the face is straight and the wheel is of suitable character. Such a face is not always obtained nor is the diameter of the wheel kept true with emery wheel dresser. This machine has a work table in front of and extending along the edge of the wheel, so that both face and edge can be used for grinding. This table is in a guide carried by a transversely swinging arm, in the end of which is placed a longitudinally adjustable diamond. This diamond attachment for the truing table can be clamped or adjusted to prevent or allow a rocking movement. When the surface of the wheel becomes dull or untrue, the table is

moved so as to carry the diamond across the face of the wheel, giving the latter a true and good cutting surface.

The table is also adjustable longitudinally in the guide and is provided with a tapped hole to receive the diamond holder. The table guide is pivoted in the diamond carrying arm and can be set and clamped at any angle up to 45 deg. with the face of the wheel. An adjustable squaring device or protractor is attached to the table, which may be set from 45 deg. to 90 deg. with the surface of the wheel. The diamond holder may be quickly transferred from one of the machines to the other. The spindle, carrying wheels 12 in. in diameter and 1½ in. thick, is hardened and runs in adjustable bronze bearings. A water tank is provided for cooling the work.

Hicks Standard Passenger Car.

The accompanying illustration shows one of the standard new passenger cars built by the Hicks Locomotive & Car Works, Chicago, for the Atlanta & St. Andrews Bay Railroad. This car illustrates a class of passenger coaches which are being built to meet the demand among smaller roads for a coach which can be used in mixed trains and at the same time have the exterior and interior finish of the car present a modern and pleasing appearance. It is claimed that the maintenance cost is quite low. The design adopted as standard is



Hicks Standard Passenger Coach.

a 54-ft. car, which provides ample capacity for small roads. Three types are built: passenger coach, combination passenger and baggage car, and combination passenger, baggage and mail car. The body sills are extra heavy, being the same size as those used in heavy cars of greater length, and the frames are the same as used by the best passenger car builders, solid blocked throughout. The platforms are all steel, carried back behind the body bolsters and securely bolted to the sill construction. The interior finish is of quarter sawed oak, with heating and lighting arrangements to meet any specification. The cars are equipped with automatic pocket couplers, drawbar centering device and complete air-brake and signal equipment. The trucks are of the same type as used in the higher priced cars. Due to the fact that this company has standardized this design of cars in its shops, a large number of each type are carried in stock in order to make early deliveries.

Brill Prizes for Senior Theses.

The J. G. Brill Company, Philadelphia, Pa., is offering to students graduating in 1909 from technical schools in the United States prizes for theses on the subject, "Design of an Electric Railway Car for City Service." The first prize will be \$250, second prize \$150, and third, \$100. In this competition the Brill Company is, in a way, starting a campaign of education. There is a tendency to feel that street railway officials are careless and indifferent in selecting cars which do not suit the convenience of the public, and it is hoped that a competition of this kind will help toward a fuller understanding of conditions.

In the theses, the subject may be considered from the standpoint of the construction of the car body, the truck, the electrical equipment and its arrangement, or any other or all standpoints the writer may elect. The jury which will judge the papers will consist of an electric railway official, a member of the editorial staff of a technical journal, and an expert in car construction. The thesis need not be prepared solely

for the contest, but may be one written in connection with graduation work. They must reach the office of the Brill Company, Technical Department, on or before June 15, 1909. For further information, that department should be addressed.

Railroad Construction in Chile.

The cost of the government railroads in Chile, for which bids are being asked, is estimated at \$65,627,000. One line is to run from Arica, on the coast of Chile, to La Paz, Bolivia, about 280 miles. The other is from La Ligua, Chile, to Copiapo, about 410 miles. Proposals should be addressed to the Minister of Public Works, Santiago, Chile, or to the Legation of Chile, Washington, D. C. The Legation at Washington will furnish all particulars to contractors desiring to bid upon the work. The date for opening the bids by the Minister of Public Works in Santiago, Chile, is February 1, 1909, for the La Ligua-Copiapo Railroad, and March 1, 1909, for the Arica-La Paz Railroad.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Victor Morawetz, Chairman of the Board of Directors of the Atchison, Topeka & Santa Fe, has resigned.

Benjamin B. Foster has been appointed Vice-President of the Elmira & Eastern Transportation Co., with office at Kansas City, Mo.

E. M. Ingersoll has been elected Vice-President of the Chicago, Milwaukee & St. Paul of Washington, with office at Tacoma, Wash.

R. H. Baker, President of the Trinity & Brazos Valley, has been elected President and Director of the Houston Belt & Terminal, succeeding W. E. Green, resigned.

H. L. Harmon, President of the Kansas City Terminal Railroad Co., has been elected also President of the Kansas City Union Depot Co., succeeding E. J. Sanford, deceased.

F. S. Fowler, Assistant Treasurer of the Lehigh & New England, has resigned and his office has been abolished. Remittances should be made to H. F. Baker, Treasurer, Philadelphia, Pa.

J. D. Morton has been appointed General Auditor of the Canadian Northern Ontario, the Halifax & Southwestern, the Canadian Northern Quebec and the Quebec & Lake St. John, with office at Toronto, Ont.

B. S. Grosscup, whose resignation as Counsel of the Northern Pacific, Western district, has been announced in these columns, is to go into general practice at Tacoma, Wash., and will also act as attorney for certain street railways in that vicinity.

F. D. Kellogg has been elected Treasurer of the Illinois Southern, succeeding C. F. Weinland, resigned. M. E. Keehan has been appointed Auditor, succeeding D. M. Cameron, resigned to accept service elsewhere, and H. Knowles has resigned as Car Accountant, to accept service elsewhere. All reports formerly sent to the Car Accountant should be addressed to the Auditor, Grand Central station, Chicago.

Charles T. Lewis, whose election as Second Vice-President and General Counsel of the Toledo & Ohio Central and the Kanawha & Michigan has been announced in these columns, was born at Marietta, Ohio, in 1850. After graduating from Marietta College in 1872 he studied law, and in 1884 became a member of the law firm of Doyle & Lewis in Toledo, Ohio. In 1896 he was made General Counsel of the Toledo & Ohio Central, which position he held until his recent election.

Operating Officers.

J. A. C. Groner has been appointed Assistant to Thomas Fitzgerald, General Manager for the Receivers of the Norfolk & Southern.

J. W. Ryan has been appointed Superintendent of the Salt.

Lake & Ogden, with office at Salt Lake City, Utah, succeeding A. D. Pierson, resigned.

W. F. Jones has been appointed Trainmaster on the Colorado division of the Union Pacific, with headquarters at Denver, Colo., succeeding E. S. Van Tassel, resigned.

E. A. Theed, Assistant Superintendent of the Toledo division of the Lake Shore & Michigan Southern, has been appointed Assistant Superintendent of the Michigan division, succeeding T. J. Dawson, assigned to other duties.

J. E. McCarthy, Trainmaster of the Iowa Central at Oskaloosa, Iowa, with jurisdiction over the entire line, has been transferred to Marshalltown, Iowa, and will hereafter have charge of the line from Albert Lea, Minn., to Centerville, Iowa, including the five branches. H. G. Kruse has been appointed Trainmaster at Monmouth, Ill., in charge of the line from Oskaloosa, Iowa, to Peoria, Ill.

E. L. Chudleigh, Trainmaster of the Canadian Pacific at Cranbrook, B. C., has been transferred to Macleod, Alb., and will have jurisdiction over the Crow's Nest section and the Macleod branch. J. A. Kennedy, Trainmaster at Medicine Hat, Alb., succeeds Mr. Chudleigh and will have jurisdiction over the Cranbrook section, including Crow's Nest terminal, Sirdar section and the Kimberly and Curzon branches. A. N. Hobkirk, Master Mechanic at Cranbrook, succeeds Mr. Kennedy.

H. V. Platt, Superintendent of the Los Angeles division of the Southern Pacific, has been appointed General Superintendent of the Southern district, with office at San Francisco, Cal., succeeding R. H. Ingram, resigned. W. H. Averell, Superintendent of the Tucson division, succeeds Mr. Platt, with office at Los Angeles. W. H. Whalen, Superintendent of the Shasta division, succeeds Mr. Averell, with office at Tucson, Ariz. J. H. Dyer succeeds Mr. Whalen, with office at Dunsmuir, Cal.

Certain lines of the Lehigh Valley are hereafter to be operated in three divisions instead of four, the Pennsylvania division being abolished. The Buffalo division is extended from Buffalo, N. Y., to include Sayre, Pa. The Wyoming division extends from Coalport, to, but not including, Sayre. The line of steamers on the Great Lakes is to be handled as a separate division known as the Lake division. R. W. Baxter, Superintendent of the Buffalo division, has been appointed Superintendent of the extended Buffalo division, with office at Buffalo. C. J. Shea, Trainmaster at Buffalo, has been appointed Assistant Superintendent of the Buffalo division, with office at Sayre. N. L. Moon remains Superintendent of the Wyoming division, with office at Wilkesbarre, Pa., and C. W. Kinney, Superintendent of the Pennsylvania division, has been appointed Superintendent of the Auburn division, with office at Auburn, N. Y., succeeding H. D. Titus, assigned to other duties. F. G. Rogers has been appointed Superintendent of the Lake division, with office at Buffalo.

Traffic Officers.

James E. Meroney has been appointed Traveling Freight Agent of the St. Louis Southwestern at Dallas, Tex.

L. J. Bunstein has been appointed Freight Agent of the Philadelphia & Reading at Erie avenue, Pa., succeeding Frank Faust, resigned.

W. H. Rutland has been appointed Assistant Traffic Manager of the Elmira & Eastern Transportation Co., with office at Kansas City, Mo.

J. M. Whitford, Commercial Agent of the Missouri, Kansas & Texas, has had his headquarters moved from Atlanta, Ga., to Chattanooga, Tenn.

J. Lallande has been appointed Assistant General Freight Agent of Morgan's Louisiana & Texas Railroad & Steamship Co. and the Louisiana & Western.

S. C. Milbourne has been appointed General Agent of the Union Pacific, the Oregon Short Line and the Oregon Railroad & Navigation Co. at Philadelphia, Pa.

W. H. Osborn has been appointed General Freight and Passenger Agent of the Illinois Southern, succeeding H. P. Radley, resigned to accept service elsewhere.

E. B. Daly has been appointed Acting Freight Claim Agent of the Kansas City Southern, with office at Kansas City, Mo., succeeding to the duties of W. E. Church, resigned.

J. H. Guyot has been appointed Soliciting Freight Agent of the International & Great Northern at Austin, Tex. J. G. Worrall has been appointed Commercial Agent at Houston.

G. N. Thomas, Traveling Freight Agent of the Wabash at Toledo, Ohio, has been transferred to Pittsburgh, Pa., reporting to R. E. Lawrence, General Agent, Freight Department.

Charles Eikel, Agent of the Mexican International at Durango, Dur., Mex., has been appointed General Agent of the Southern Pacific at Monterey, N. Leon, Mex., succeeding H. N. Gibson, deceased.

F. E. Browne, General Agent of the Gulf & Interstate, has resigned, and that office has been abolished. All matters pertaining to traffic will hereafter be handled by J. R. Dillon, Second Vice-President.

F. H. Clendenning has been appointed City Freight Agent of the Canadian Pacific and District Freight Agent of the Esquimalt & Nanaimo, with office at Victoria, B. C., succeeding George L. Courtney, resigned.

J. A. Barry, Traffic Manager of the Jamestown, Chautauqua & Lake Erie and the Chautauqua Steamboat Co., has resigned, and his position has been abolished. H. A. Macbeth, Freight Agent, succeeds to Mr. Barry's duties.

G. F. Snow, General Freight Agent of the Bangor & Aroostook, has been appointed Special Agent at Bangor, having direct charge of all industrial matters. George E. Wicks succeeds Mr. Snow, with office at Bangor, Me.

John H. Howard, Freight Claim Agent of the Chicago & Alton and the Toledo, St. Louis & Western, has been appointed Freight Claim Agent of the Chicago Great Western, with office at St. Paul, Minn., succeeding J. W. Adams, resigned to go to another company.

H. B. Belt, Assistant Freight Claim Agent of the Chicago & Alton and of the Toledo, St. Louis & Western, has been appointed Freight Claim Agent of these roads, with office at Chicago, succeeding John H. Howard.

Gabe Filluel, Joint Commercial Agent of the National Lines of Mexico and the Mexican Central at New Orleans, La., has been appointed also General Passenger Agent of the Mexican-American Steamship Line, with office at New Orleans.

J. F. Horrigan, Assistant Freight Claim Agent of the Northern Pacific, has been appointed Freight Claim Agent, with office at St. Paul, Minn., succeeding W. J. Horrigan, resigned. J. M. Mooney succeeds J. F. Horrigan, with office at Tacoma, Wash.

E. A. Turner, Commercial Agent of the International & Great Northern at Dallas, Tex., has been appointed to a position in the general freight office at Palestine, Tex. George Simpson, Soliciting Freight Agent at Galveston, Tex., succeeds Mr. Turner.

J. A. Steltenkamp, Traveling Passenger Agent of the Missouri Pacific and the St. Louis, Iron Mountain & Southern at Cincinnati, Ohio, has been transferred as Traveling Passenger Agent to Louisville, Ky., succeeding J. H. Gallagher, resigned. W. J. Frost succeeds Mr. Steltenkamp.

E. D. Parker, whose appointment as Assistant General Freight Agent of the Minneapolis, St. Paul & Sault Ste. Marie at Minneapolis, Minn., has been announced in these columns, was born in 1839 at Granville, Ohio. After graduating from Marietta College, he began railroad work September 22, 1863, on the Lake Shore & Michigan Southern. In 1882 he left the Lake Shore to go to the Mille Lacs Lumber Co., and two years later was made Agent of the Minnesota Transfer Co. In 1886 he was appointed General Agent of the Albert Lea Route of the Chicago, Rock Island & Pacific at St. Paul, and, in February, 1888, became Local Freight Agent of the Minneapolis, St. Paul & Sault Ste. Marie. A month later he was made General Agent, and by 1895 had become Assistant General Freight Agent at St. Paul, Minn., which position he held until his recent transfer to Minneapolis.

Engineering and Rolling Stock Officers.

J. M. R. Fairbairn has been appointed Principal Assistant Engineer of the Canadian Pacific.

C. B. Brown has been appointed Division Engineer of the Eastern division of the Canadian Pacific, with office at Montreal, Quebec.

Frank Taylor has been appointed Division Engineer of the Lake Superior division of the Canadian Pacific, with office at North Bay, Ont.

G. L. Wetmore has been appointed Division Engineer of the Atlantic division of the Canadian Pacific, with office at St. John, N. B.

A. H. Powell, Master Mechanic of the Denver & Rio Grande at Grand Junction, Colo., has been appointed Master Mechanic at Salt Lake City, Utah.

A. T. Shortt has been appointed Master Mechanic at Cranbrook, B. C., succeeding A. N. Hobkirk, promoted as mentioned under Operating Officers.

T. F. Barton, Master Mechanic of the Chicago division of the Illinois Central, has been appointed Master Mechanic of the Morris and Essex division of the Delaware, Lackawanna & Western, effective October 15.

L. N. Miller, Engineer of Maintenance of Way of the Mexican Central at Chihuahua, Chih., Mex., has been transferred, as Engineer of Maintenance of Way, to the Mexican division, succeeding J. T. Gardner, with office at Mexico City.

C. E. Lindsay, Engineer of Maintenance of Way, Electric Zone, of the New York Central & Hudson River, with office at New York, has been reappointed Division Engineer of the Mohawk division, with office at Albany, N. Y. He held this position before his appointment in May, 1907, on the Electric Zone.

G. M. Crownover, Assistant Master Mechanic of the Chicago division of the Illinois Central, has been put in charge of the Burnside shops, and his former position has been abolished. A. J. McKillop, Master Mechanic at Freeport, Ill., has been appointed Master Mechanic of the Chicago division, succeeding T. F. Barton, resigned to go to the Delaware, Lackawanna & Western. V. U. Powell, Master Mechanic of the Peoria division of the Illinois Central and the Indianapolis Southern at Mattoon, Ill., succeeds Mr. McKillop; and Frank W. Taylor, General Foreman at Louisville, Ky., succeeds Mr. Powell.

Purchasing Officers.

H. J. Steinboemer, Storekeeper of the San Antonio & Aransas Pass at Yoakum, Tex., has been appointed Chief Clerk to the Purchasing Agent, with office at San Antonio, Tex.

W. W. Davis has been appointed Storekeeper of the Eastern of New Mexico at Amarillo, Tex., succeeding F. C. McLaughlin, transferred. C. M. Smith, Storekeeper of the Albuquerque division of the Atchison, Topeka & Santa Fe (Coast Lines) at Winslow, Ariz., has been transferred to the Valley division at Richmond, Cal. H. D. Weir succeeds Mr. Smith.

Special Officers.

James A. Griffith has been appointed Land Commissioner of the Union Pacific, succeeding B. A. McAllaster, recently appointed Land Commissioner of the Southern Pacific and the Oregon & California.

OBITUARY.

T. L. Smith, Master Mechanic of the Chicago, Burlington & Quincy at Beardstown, Ill., died on September 29. Mr. Smith was 54 years old. He began railroad work as a machinist and apprentice on the Baltimore & Ohio. Later he was employed on the Pennsylvania, and from 1876 to 1881 was again connected with the Baltimore & Ohio. From 1881 to 1902 he was successively gang boss, roundhouse foreman, Road Foreman of Engines and Assistant Master Mechanic of the Chicago, Burlington & Quincy. In April, 1902, he was appointed Master Mechanic, which position he held until his death.

Railroad Construction.**New Incorporations, Surveys, Etc.**

CAIRO & ST. LOUIS.—Incorporated in Illinois, with \$100,000 capital stock, to build from a point in or near Cairo, Ill., north to a point in or near East St. Louis. The incorporators and first board of directors are: William B. McKinley, George M. Mattis, W. H. Carnahan and George W. Burton, all of Champaign, Ill., and L. E. Fischer, of Danville, Ill.

CANADIAN NORTHERN.—Preliminary surveys said to be made for a 50-mile line from this company's coal fields, which extend over 20,000 acres near the Brazeau river, Alb., to connect with the line of the Grand Trunk Pacific at a point between the Pembina and McLeod rivers. The grade as laid out from the mines to the G. T. P. will permit moving cars by gravity.

CANADIAN NORTHERN ONTARIO.—Consul G. W. Shotts, of Sault Ste. Marie, reports that the new line of this company, recently opened for traffic between Toronto, Key Harbor, Sudbury, and the Moose Mountain mines at Sellwood, has brought into easy access the best fishing, hunting and canoeing territory in the Province of Ontario. Key Harbor, situated on the northwestern borders of the Georgian Bay, will in time become an important shipping point. The docks now built for handling iron ore are large and up-to-date. The plans of the company include an extension, eventually, westward to connect with the Canadian Northern, which reaches Port Arthur and extends into the wheat belt of the Northwest. This will give a through line. The principal port for trans-shipping will be Key Harbor. (R. R. G., Mar. 13, p. 395.)

CANADIAN NORTHERN QUEBEC.—Canadian press reports say that a contract for building the extension to Rawdon, Que., has been let to J. P. Mullarkey, of Montreal, and that the line is to be completed during the present year. Gangs of men are said to be clearing the right of way in the vicinity of Rawdon and grading will be commenced within a few days.

CANADIAN PACIFIC.—Work on the extension of the Esquimalt & Nanaimo, according to Consul Abraham E. Smith, of Victoria, B. C., is actively progressing from Wellington, B. C., via Nanoose, to Alberni, at the east end of the Alberni canal, Vancouver island. It is now expected that the new line will be in operation to Alberni during 1909. A large force of men have been at work clearing the right of way. Efforts are being made to avoid the sharp curves and steep grades such as are on portions of the main line from Victoria to Wellington. A large car ferry is now being built at Victoria to run from Nanoose to Vancouver, to carry freight and passengers without trans-shipment. It is expected that when this extension is completed the Canadian Pacific steamers will make their first call on this continent en route from the Orient at Alberni, which is situated on a canal of the same name, approached from the Pacific ocean through Barkley sound, which is on the southern side of the island, just north of Cape Beale. A railroad route has been surveyed for a westerly branch from Duncan, a station 30 miles north of Victoria on the E. & N., to Cowichan Lake, and a subsidy has been voted therefor by the Dominion Parliament, but it is not expected that work will be begun on the proposed line until next year. Another line has also been surveyed from Great Central Lake, which is 11 miles northwest of Alberni. (July 17, p. 554.)

CHICAGO & NORTH-WESTERN.—According to the annual report of this company for the year ended June 30, 1908, the following lines have been completed and opened for operation:

Pierre, Rapid City & North-Western, extending from a connection with the Pierre & Ft. Pierre Bridge, 0.2 miles north of Ft. Pierre, S. Dak., to Rapid City, 165.48 miles.

Pierre & Ft. Pierre Bridge, extending from a connection with the Chicago & North-Western, at Pierre, S. Dak., to a connection with the Pierre, Rapid City & North-Western, 0.2 miles north of Ft. Pierre, 1.82 miles, including bridge over the Missouri river.

Wolf River Valley, extending from the end of the Elton, Wis., branch to Van Ostrand, Wis., 1.98 miles.

An extension at Pierre, S. Dak., from an intersection with

the main line of the Dakota division to a connection with the Pierre & Ft. Pierre Bridge at the west line of Reed street, 0.95 miles.

An extension from Gregory to Dallas, S. Dak., 4.49 miles.

CHICAGO, MILWAUKEE & ST. PAUL.—Work has begun on the last strip of grading within the city limits of Tacoma, Wash., comprising a cut varying from 8 to 12 ft. deep, between East D street and Pacific avenue, about a block and one-half long. Work is to be completed by January 1, 1909, when track laying will be commenced.

See article on Pacific extension, page 1,095 of this issue.

DAKOTA & WESTERN.—Incorporated in South Dakota, with \$100,000 capital, to build from Rapid City, S. Dak., south-west to Hill City, 20 miles, with a provision for an extension westerly into Wyoming. The incorporators are: A. M. Lanphere, W. H. Lanphere, T. A. Mair, Knute Kleven and J. W. Cook, all of Rapid City.

DELAWARE & EASTERN.—An officer of W. J. Oliver & Co., which has a contract for building this line from Grand Gorge, N. Y., northeast to Schenectady, writes that the work has been delayed since sufficient funds to cover this construction have not yet been raised by the promoters. (Oct. 2, p. 1,075.)

DENVER, LARAMIE & NORTHWESTERN.—Press reports from Denver, Colo., say that within a few days active work will be commenced in laying the track on the 40 miles of line already completed. Between Fort Collins, Colo., and Laramie, Wyo., the company is considering three lines: One northward to Laramie, another to the west into a new territory, and the third to run in an easterly direction. It is also expected that within a few days' time the new bridge over Clear creek on the main line will be finished. (Aug. 7, p. 693.)

DENVER, NORTHWESTERN & PACIFIC.—Press reports say this line has been opened to Yampa, Colo., near Toponas, 171 miles west of Denver. It is expected to have the next section, 44 miles, finished to Steamboat Springs this year. The road is eventually to be extended west to Salt Lake City, Utah. (July 17, p. 554.)

ESTACADO & GULF.—An officer writes that contracts have been let for building 30 miles of this line from Roby, Tex., east to Grider, a new town 10 miles east of McCaulley. The company was chartered to build from Roby east and thence southeast to Coleman, 100 miles. Grading has been finished from Roby to McCaulley, and contracts for similar work let to W. J. Cox from McCaulley to Grider. From Grider it is the intention to build a branch line in a northeast direction. Shops are to be put up at Grider. W. A. Butts, President, Roby. (Sept. 11, p. 932.)

FORT WORTH, WEATHERFORD & MINERAL WELLS INTERURBAN.—Surveys are being made by Baxter Brown, of St. Louis, Mo., for an electric line from Fort Worth, Tex., west via Weatherford to Mineral Wells, 55 miles. The Fort Worth Board of Trade is interested. Construction, it is said, will be started soon by Colonel C. B. Duffy.

GRAND TRUNK PACIFIC.—Contracts said to be let to O'Brien & McDougall for the two remaining sections of this line in Ontario. (Sept. 25, p. 1,027.)

GULF & MAGNOLIA.—Incorporated in Arkansas, with \$100,000 capital, to build from Magnolia, Ark., northwest via Waldo to Hope, 35 miles. W. Y. Foster, President, Hope; J. M. Davis, Vice-President, Waldo, and J. L. Davies, Treasurer, Magnolia. The headquarters of the company are at Hope.

IDAHO & WASHINGTON NORTHERN.—The west bank of the Pend d'Oreille river has been chosen as the route for the extension from Newport, Wash., to Metaline. Surveying parties have been working on both sides of the river since early in June, making a comparison of the cost of construction, maintenance and operation of the two routes. The west side was chosen because it will control the business on both sides of the river. The extension will be about 55 miles long and should be completed in about eight months. (Aug. 21, p. 788.)

INTERCOLONIAL.—To correct the exaggerated reports concerning construction work on this road, a Consular report says that the only double-tracking to be carried out at the present time is between Moncton, N. B., and Painsée Junction, 7 miles. Surveys are being made over the remaining portion between

Painsée Junction and Halifax, 186 miles, principally to determine the probable cost of construction. (Aug. 28, p. 839.)

ESQUIMALT & NANAIMO.—See Canadian Pacific.

GRAND TRUNK PACIFIC.—An officer writes that the line from Winnipeg, Man., west to the eastern foot of the Rocky mountains, will be 916 miles, and from that place west to Prince Rupert, on the Pacific coast, 836 miles, a total of 1,752 miles. The first section was recently opened for operation from Winnipeg, west to Battle river, in Alberta, 666 miles. From Battle river to the foot of the Rocky mountains, 250 miles, construction work is far advanced. The line has been located from the eastern foot of the Rocky mountains to Prince Rupert, and work is now under way on the first 100 miles from Prince Rupert, east. (Sept. 28, p. 1,027.)

KANSAS CITY, MEXICO & ORIENT.—An officer writes that it is expected to have the road completed and in operation by December 1 from Sweetwater, Tex., north to Wichita, Kan., 432 miles. A portion of the line from Sweetwater south towards San Angelo has been built, and it is probable that this work will be pushed as soon as the line above mentioned is completed. The company is unable to give out anything definite about work southwest of San Angelo at this time.

MATANE & GASPE.—Construction work has begun, according to the report of Consul F. M. Ryder, of Rimouski, Quebec, on this new line to run from St. Flavie, Que., on the Intercolonial, 18 miles below Rimouski, and to ultimately have its terminus at Gaspé, 240 miles. The headquarters of the company are in the city of Quebec. For the present the first section only, for 37 miles from St. Flavie, is contemplated. The company will finish the line as quickly as possible to Mont Louis, 133 miles, where there is a protected harbor, surrounded on three sides by high cliffs, with deep water up to the rocks. It extends inland over 2 miles and is open the year round. The company is to receive bonuses from both governments, as well as from the towns and parishes through which the road will pass. The Federal bonus varies from \$3,200 to \$6,000 per mile; the provincial grant is 4,000 acres of land per mile, or 148,000 acres for the first section of 37 miles; the town of St. Flavie has voted \$5,000; Little Metis, \$500; Sandy Bay, \$4,000; Rivière Blanche, \$3,000, and Matane, \$13,000. Contract said to be let to H. J. Beemer & Co. for building first 35 miles. Hon. P. A. Choquette, President, Quebec.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—An officer of this company is quoted as saying that rapid progress is being made on the branch building from Brocton, Minn., northeast via Superior, Wis., to Duluth, Minn., 300 miles. It is expected to have grading finished this year to within 39 miles of Superior, and to start construction work early next spring on terminals and yards.

MISSOURI, KANSAS & TEXAS.—Application has been made by this road for the use of certain parts of Griffin, Sumpter and Laws streets, Dallas, Tex., in which to lay tracks and maintain freight yards. This road expects to build about seven miles of additional switch tracks in Dallas and make other improvements to cost approximately \$200,000.

MORGAN'S LOUISIANA & TEXAS.—See Southern Pacific.

NEW YORK, WESTCHESTER & BOSTON.—See New York, New Haven & Hartford under Railroad Financial News.

NORTH CAROLINA ROADS.—Location surveys said to be made for a line from Causey, N. C., southwest to a point near Erect, about 16 miles. Dunlap Bros., Causey, may be addressed. R. Tull, Causey, is engineer in charge.

NORTHERN PACIFIC.—The land board of Montana has granted permission to this company to build from Glendive, Mont., north to Mondak, connecting the Northern Pacific and Great Northern. The line will follow closely the route of the new government canal now building.

OREGON RAILROAD & NAVIGATION.—The first train over the new line from Elgin, Ore., east to Wallowa was run on September 20. The line will be further extended from Wallowa southeast to Joseph, about 30 miles, and should be completed by next spring. (R. R. G., March 13, p. 393.)

ROCK ISLAND SOUTHERN (ELECTRIC).—This company, operating a 16-mile line from Galesburg, Ill., west to Monmouth,

is being extended north to Aledo, 22 miles, by the Rock Island Construction Co., of Rock Island. Contract for an additional 12 miles from Aledo northeast to Preemption said to be let to the P. T. Walsh Construction Co., Davenport, Iowa.

SOUTHERN PACIFIC.—A contract involving the handling of 700,000 cu. yds. of earth is said to have been let recently for an embankment through the Atchafalaya swamp. This work is on the extension of the Morgan's Louisiana & Texas, from Lafayette, La., northeast to Port Allen, opposite Baton Rouge, 53 miles. (R. R. G., March 13, p. 394.)

VIRGINIA AIR LINE.—An officer writes that this road, running from Lindsay, Va., to Strathmore, with trackage rights over the Chesapeake & Ohio, to Gordonsville, is now in operation. The line is 30 miles long, and has a traffic agreement with the Chesapeake & Ohio, which guarantees a certain minimum daily traffic for a period of 50 years. The work on the property is completed with the exception of several small stations and final top dressing of the ballasting. (Oct. 11, p. 436.)

Railroad Financial News.

BOSTON & MAINE.—Stockholders of the Fitchburg Railroad have voted to authorize an issue of \$500,000 bonds to provide for refunding a like amount of one year 6 per cent. bonds maturing January 15, 1909, and to increase the capital stock by an issue of \$700,000 preferred stock. There is now outstanding \$17,360,000 preferred stock.

J. P. Morgan & Co., New York, deny the report that they are interested in the purchase made some time ago by John L. Billard of the shares of the Boston & Maine which he bought from the New York, New Haven & Hartford.

CANADIAN PACIFIC.—At a special meeting of the stockholders held October 7, an increase of \$50,000,000 common stock was authorized, the stock to be issued from time to time as determined by the directors. The amount of common stock already outstanding is \$146,016,000. Sir Thomas Shaughnessy, President, says that in a general way the proceeds from the sale of the stock will be used for securing of additional equipment and for the completion of new lines already started.

CHICAGO & ALTON.—At the annual meeting, the directors and officers were re-elected.

CINCINNATI, BLUFFINGTON & CHICAGO.—This company, which is in the hands of a receiver, having defaulted on interest coupons due September 1, 1908, on its first mortgage 5 per cent. bonds, the Mansfield Banking Co., of Mansfield, Ill., is forming a bondholders' protective committee. The C. B. & C. operates 52 miles of line from Bluffington, Ind., to Portland.

FITCHBURG RAILROAD.—See Boston & Maine.

LOUISVILLE & EASTERN (ELECTRIC).—It is said that the Louisville & Frankfort is negotiating to buy this property, subject to \$650,000 first mortgage 5 per cent. bonds of 1903-1956. The Louisville & Eastern operates a line from Louisville, Ky., to La Grange, 27 miles, on private right of way.

NATIONAL RAILWAYS OF MEXICO.—President Diaz, of Mexico, in a message to Congress, says in part: "The National Railways of Mexico have succeeded in getting the holders of shares and bonds of the National Railroad of Mexico and the Mexican Central to exchange their securities for securities of the new company (National Railways of Mexico), and although the bonds and shares in question were widely scattered, only a small fraction remains outstanding, ranging from 1 per cent. of some of the securities to a maximum of 5 per cent. in the case of others." (R. R. G., April 10, 1908, page 526.)

NEWPORT-WICKFORD STEAMBOAT & RAILROAD.—Angus McLeod and Robert W. Taft have been appointed Receivers. J. W. Miller, President, and George G. King and Hugh D. Auchincloss, Directors, have resigned, and William P. Clarke, C. Burnick and William P. Buffum were elected Directors in

their places. The road runs from Wickford Junction, R. I., to Wickford, 3.4 miles.

NEW YORK, NEW HAVEN & HARTFORD.—The Court of Appeals in a decision handed down Tuesday holds that the New York, Westchester & Boston, which is controlled by the New Haven, should obtain a certificate of convenience and necessity from the Public Service Commission before building its road. The question arose in the so-called Huntington case in connection with condemnation of lands for right of way. The judgment and order of the lower court is reversed. (Aug. 28, p. 840.)

RUTLAND RAILROAD.—In a circular issued to holders of preferred stock by Cummings & Co., Tompkins C. Delavan, of that firm, who represents the minority interests, says in part:

"One of the things asked for by your representative at the first annual meeting he attended was that one or more places on the board of directors should be accorded to the minority interest which he represented, but so far those in control have persistently refused to accede to this request.

"It is true that maintenance of the property is expensive and that improvements cost money, and in this case it is a question whether some of the improvements, such as new shops, bridges and new equipment, acquired during the last few years should not be capitalized and not paid for out of earnings; but if such things are paid for out of earnings then stockholders whose money has thus been used are certainly entitled to stock to represent the funds which they have been forced to contribute."

ST. LOUIS & SAN FRANCISCO.—The New York Times says that the \$7,100,000 notes of the St. Louis & San Francisco, due December 1, 1908, are to be extended for a year through a syndicate organized by Speyer & Co., New York.

SOUTHERN INDIANA.—The first mortgage bondholders' committee, A. G. Hodenpyl, Chairman, announces that 70 per cent. of the \$7,500,000 first mortgage 4 per cent. bonds have been deposited with it.

TAMPA NORTHERN.—Baker Ayling & Co., Boston, Mass., are offering a block of first mortgage 5 per cent. bonds of 1906-1936. The amount of outstanding bonds is limited to \$10,000 per mile of completed line and for acquisition of terminals, the total issue being limited to \$5,000,000. The road is in operation from Tampa, Fla., to Brooksville, 50 miles.

THE MUNICIPAL TRACTION CO.—This operating company of the street railways of Cleveland, Ohio, has imposed, it is said, the condition that the money which it offers to pay as quarterly rental (about \$220,000) to the Cleveland Railway must be used for the payment of the second 1½ per cent. quarterly dividend on the \$14,675,600 stock of the Cleveland Railway. This condition the Cleveland Railway has refused to comply with, claiming that the matter of dividends is entirely between the directors and the stockholders, while the Municipal Traction Company says that the passing of a dividend by the Cleveland Railway would tend to discredit the Traction Company with the investing public.

THIRD AVENUE RAILROAD.—Transfers between the Union Railway, New York, which is controlled by the Third Avenue, and the Yonkers Railway and the Westchester Electric Railway, were discontinued at midnight, October 6, by permission of Judge Lacombe. F. W. Whitridge, receiver for the Third Avenue, says that this step was necessary because no arrangements could be made with the managers of the Yonkers and Westchester roads for an equitable share of the receipts from transfer arrangements.

WESTERN MARYLAND.—The interest due October 1 on the \$42,518,000 first mortgage bonds of 1902-1952 was paid at the office of the Mercantile Trust Co., New York. The receiver is to issue \$600,000 5½ per cent. certificates, payable in monthly instalments of \$100,000, to reimburse the trust company for this interest payment.

WHEELING & LAKE ERIE.—The interest due July 1 on the \$1,998,000 equipment bonds of 1902-1922 is being paid at the office of the Mercantile Trust Co., New York. (July 24, p. 602.)

ANNUAL REPORTS

NEW YORK, NEW HAVEN & HARTFORD—THIRTY-SEVENTH YEAR.

In accordance with the By-Laws of The New York, New Haven and Hartford Railroad Company, the Board of Directors have caused to be prepared a general statement of its affairs for the year ending June 30, 1908, as follows:

FOR TWELVE MONTHS, JULY 1, 1907, TO JUNE 30, 1908, INCLUSIVE.

Operating Revenue—

| | |
|---|-----------------|
| Freight Revenue | \$25,281,434.85 |
| Passenger Revenue | 23,003,115.93 |
| All other revenue from transportation | 3,506,133.10 |
| Revenue from operations other than transportation | 1,259,463.38 |

Total operating revenue..... \$53,050,147.26

Operating Expenses—

| | |
|-------------------------------------|---------------|
| Maintenance of way and structures.. | 5,983,825.90 |
| Maintenance of equipment | 6,913,169.06 |
| Traffic expenses | 311,224.06 |
| Transportation expenses | 23,625,503.68 |
| General expenses | 1,379,834.65 |

Total operating expenses (72.03%) 38,213,557.35

Net operating revenue..... 14,836,589.91

Net revenue from outside operations. 1,212,089.03

Net earnings—The New England Steamship Co. (3 months)..... 498,674.10

Net earnings—The Connecticut Co.. 2,745,758.00

Total 4,456,521.13

Total net revenue..... 19,293,111.04

Taxes 3,338,305.83

Income from Other Sources—

| | |
|----------------------------|--------------|
| Dividends on stocks..... | 894,700.01 |
| Interest on bonds..... | 714,990.71 |
| Miscellaneous income | 1,889,001.77 |
| Rents received | 363,458.58 |

Total income from other sources 3,862,151.07

Total income 19,816,956.28

Deductions from Income—

| | |
|---|--------------|
| Interest on bonds, debentures and other liabilities | 7,556,045.07 |
| Rentals of leased lines..... | 4,581,181.87 |
| Rentals and guaranteed dividends other than above | 1,784,299.28 |
| Hire of equipment | 628,860.51 |

Total deductions from income... 14,550,387.13

Net income 5,266,569.15

Dividends Nos. 112 to 115 inclusive, 2% each 8,297,046.00

Less dividend on stock held by subsidiary companies 495,784.00

7,783,262.00

Deficit 2,516,692.85

The General Statement for the year 1907 was made up on the basis of a consolidation of the balance sheets and income accounts of all the companies controlled in the interest of your company through the ownership of all or a majority of their capital stocks, excepting only the New York, Ontario & Western and Central New England Railway companies, but through the disagreement of the various tables and exhibits with the reports made to the several state commissions and the Interstate Commerce Commission for The New York, New Haven & Hartford Railroad Company proper, which disagreement, however, was entirely logical and explainable, there resulted a great deal of misunderstanding, misrepresentation and unjustifiable conclusions. It has, therefore, been deemed advisable to make the general statement for the year 1908 conform to that published for the year 1906, including in a foot note to the balance sheet any obligations of controlled companies for which The New York, New Haven & Hartford Railroad Company has become responsible, and in the income account only such earnings as have been received or been declared in the form of dividends on stocks owned by the company and the interest received on loans.

The financial year commencing July 1, 1907, opened under the most promising conditions.

The earnings of the company for the first quarter exceeded all expectations, and the management was under the greatest strain to do the business offered. The pressure was such there was little chance for economy, the whole effort being to provide the necessary facilities to keep the business moving at any cost.

The demands of the public for improvement in transportation facilities led to large commitments for new equipment, for the elimination of crossings, for additional yards and sidings and for additional main tracks.

The earnings of the company for the second quarter showed an increase over the same quarter of the previous year, but it was all in the months of October and November, 1907, and in the month of December the tide turned and the first decrease in the company's earnings for several years was manifest.

A statement is given below showing a comparison of the earnings of the company month by month for the years ending June 30, 1907, and 1908, respectively, from which the effect of the changed business conditions can be noted:

| Fiscal Year | 1907 | 1908 | Increase | Decrease |
|----------------------|-----------------|-----------------|----------------|----------------|
| | 1906 | 1907 | | |
| July | \$4,682,289.04 | \$5,029,597.94 | \$347,308.90 | |
| August .. | 4,815,108.97 | 5,350,063.59 | 534,954.62 | |
| September.. | 4,802,221.64 | 5,000,836.23 | 198,614.59 | |
| October .. | 4,827,014.43 | 5,196,679.96 | 369,665.53 | |
| November.. | 4,744,514.93 | 4,747,661.03 | 3,146.10 | |
| December... | 4,455,780.42 | 4,172,047.75 | | \$283,732.67 |
| | 1907 | 1908 | | |
| January .. | 4,308,381.82 | 3,679,416.62 | | 628,965.20 |
| February .. | 3,749,129.30 | 3,359,707.03 | | 389,422.27 |
| March ... | 4,612,498.88 | 3,874,617.85 | | 737,881.03 |
| April | 4,600,895.70 | 4,149,689.48 | | 451,206.22 |
| May | 5,033,045.48 | 4,132,563.47 | | 900,482.01 |
| June | 4,971,055.71 | 4,357,266.31 | | 613,789.40 |
| Total gross earnings | \$55,601,936.32 | \$53,050,147.26 | \$1,453,689.74 | \$4,005,478.80 |

The loss in earnings was for a long time confined to the freight business, and for several months but little change in the passenger business was observed, but during the past summer the change in the latter has been quite marked.

It was a difficult task to reduce the expenses from the high water mark that had prevailed to December 31, 1907. The public have yielded although most unwillingly to a moderate reduction in service and facilities; the employees have been reduced in numbers but not in their rate of compensation; the officials have had a cut in salaries, but the great items that enter into the cost of conducting the affairs of a public service corporation are still at the highest mark of the most prosperous times of recent years, and, unless labor and those controlling the price of materials share the necessary liquidation, it is inevitable the price of transportation must be advanced in order that a reasonable return be had upon the money invested. It must be admitted there is an economic fallacy somewhere in a policy that results in an advance in prices during a period of extreme depression, but it is impossible for any one interest to bear the burden of high prices for the major portion of what constitutes its cost of production, and with a constantly diminishing volume of business be barred from receiving a sufficiently remunerative return upon the same.

During the last quarter of the year the expenses of the company were reduced to about as low a point as was possible without the material condition of the property was impaired, and we enter upon the new financial year upon about as low a basis of expense as is practicable without further serious reductions in the service are made, and the prices of labor and materials are reduced to the basis of 1906. Our earnings are about on the basis of that year.

It has been the policy of the company to preserve a stable rate of return to its stockholders. The company has realized for the stock issued by it largely in excess of \$100 per share, one recent subscription having been taken at the price of \$175 per share. The rate of return to our stockholders upon the average price paid for their shares has been not in excess of 4½ per cent. per annum, and a recent valuation of the company's property indicates that an 8 per cent. dividend amounts to a return to stockholders of less than 4 per cent. of the replacement value of their property.

All the surplus earnings in excess of dividend requirements have been diverted to other uses of the company, and the amount so diverted during the present administration of the property has been as shown below, viz.:

| | |
|------------|----------------|
| 1904 | \$ 88,307.98 |
| 1905 | 308,052.44 |
| 1906 | 3,718,285.41 |
| 1907 | 1,988,053.70 |
| | \$6,102,699.53 |

This was after most liberally maintaining and improving the property out of its operating and maintenance expenses, and in addition there were excess earnings in the treasuries of subordinate companies that could have been diverted to your company in the form of dividends, had it been desired.

The deficit shown in earning the dividend paid for the financial year has been partially owing to the new method of accounting prescribed by public authorities. Whether this new method will be ultimately effective and obligatory is a matter still in doubt, the railroads of the country generally having protested against it.

The six-track construction of the Harlem River & Port Chester Railroad has been continued. A portion of the new line has been put into service. The bridges are practically complete. Forty-four per cent. (44%) of the total work has been completed in the past year.

The second track construction between Seymour and Waterbury is complete with the exception of the Naugatuck passenger station, which will be finished about September 30, 1908.

The new high grade main tracks in Waterbury have been put into

service. Work on the new passenger station is progressing satisfactorily. A small amount of work remains to be done on the new freight houses and yard. Grading of the streets leading to the passenger station is not yet complete. The entire improvement should be completed by April, 1909.

The construction of the second track between Danbury and Hawleyville has been completed.

Improvements at Hawleyville, including changes in tracks and extension of freight yard, are well under way and should be completed about September 30, 1908.

Improvements at the Morgan street freight yard, Hartford, Conn., are practically completed. Elimination of grade crossing at Walnut street will be completed before the close of the year 1908.

The second track construction between Waterbury and Bristol is practically completed as far east as Greystone. In October, 1907, work was suspended between Greystone and Bristol, including the Terryville tunnel, and has not yet been resumed.

The work of providing additional tracks and widening the cut through the city of New Haven is practically completed; four tracks, with necessary signals, etc., having been put into operation during the year. There remains to be constructed the approaches to the Fair and Crown street bridges from State street. Work on the viaduct (which will carry the street railway tracks, now located in State street), has been commenced and will be completed during the coming year.

The construction of the double track connecting line in Providence, including tunnel, has been prosecuted vigorously during the year. The advanced headings of the tunnel met April 6, 1908. Concrete arch roof was completed in May, 1908. The tunnel should be entirely complete on or about September 30, 1908. Excellent progress is being made on the viaduct leading from the west portal of the tunnel and the new drawbridge at the east portal over the Seekonk river is in place. It is expected that the remaining construction work, including track laying, signals and interlocking, etc., will be completed during the year 1908.

Number of Grade Crossings Eliminated.

| | |
|-----------------------------|----|
| State of New York..... | 12 |
| State of Connecticut..... | 12 |
| State of Rhode Island..... | 2 |
| State of Massachusetts..... | 8 |
| Total | 34 |

The electrification of the New York Division between Stamford and Woodlawn has been completed and a complete change from steam to electric traction for all passenger service on this section of our line was made effective during the month of June, 1908.

New passenger stations or increased facilities have been provided during the year at Burrage, Cumberland Mills, Darien, East Taunton, North Hanson, Naugatuck, Oakville, Pelham, Pelham Manor, Rye, Stepney and Union City.

Work is in progress and will be completed during the coming year on new passenger stations or increased facilities at East Hampton, Georgetown, Hunt's Point, Morris Park, Mamaroneck, Port Morris, Woodside, Westchester Avenue and Waterbury.

New freight houses or increased freight facilities have been provided during the year at Acushnet, Bridgeport, Brookfield Junction, Braleys, Campello, Danbury, East Taunton, Holyoke, Lowell, Mount Vernon, Middletown, New Bedford, New Milford, New Rochelle, Norwich, Newport, Pelham Manor, Providence, Plymouth, Quincy Adams, South Boston, Summit, R. I., South Windham, South Worcester, Springfield, Union City, Waterbury, Watuppa, Woonsocket and Wollaston.

Work is in progress and will be completed on new freight houses or increased facilities at Morgan Street (Hartford), Hawleyville, Lee, Lowell, North Hanson, Providence, South Norwalk, Taunton, Torrington and Winsted.

The work of rebuilding the coal pocket at Dover Street Yard, South Boston, which was destroyed by fire March 13, 1907, has been completed and the plant is now in service.

A new coaling plant at Harlem river is under construction and will be put into service during the year 1908.

New 75-ft. turntables have been provided at Danbury, Great Barrington, Lowell and Winsted.

Improvements and additions to engine terminal facilities have been made at Harlem river, Lowell, New Haven, New Bedford, Springfield, South Framingham, South Boston and Stamford.

A power station has been constructed at Bay Chester, N. Y., for the operation of the drawbridge over the Hutchinson river.

The elimination of the Dudley Street grade crossing in the City of Boston, including four-track masonry, etc., for Dudley Street, Norfolk Avenue, Cottage and Clapp Streets, has been completed and the grade crossing discontinued. Plan and decree for the elimination of nine highway crossings in the city of Boston are complete and the court has ordered the elimination. The necessary real estate is now being secured.

At Northern avenue, Boston (freight terminal), extensive changes necessitated by extension of the street have been carried on in conjunction with work done by the city and are now about fifty per cent. (50%) completed.

The elimination of grade crossings at New Bedford, including nine

highway crossings, is substantially complete; all the masonry having been finished and the grade crossings discontinued.

The elimination of grade crossings at Southbridge and Cambridge streets, Worcester, has been commenced and is well under way.

The elimination of grade crossings at Fairmount avenue and Bridge street in the town of Hyde Park will be completed during the coming year.

The elimination of grade crossing at County road, Barnstable, will be completed by October 1, 1908.

The elimination of grade crossings at White's crossing, Putnam, and Main street, East Hartford, have been completed.

Elimination of grade crossing at Walnut street, Hartford, will be completed during the year 1908.

Improvements and additions to signaling and interlocking have been made at Lyme, Niantic, Plainville, Putnam, East Hartford, Burnside, Vernon, Northrup Avenue, Providence, Woonsocket, Kingston, Providence passenger station, West Roxbury, Needham, Forest Hills, Harrison Square to Mattapan, Back Bay, Neponset river drawbridge and Onset Junction. Changes in the signaling system between Woodlawn and Stamford have been made to adapt same to electric operation.

Improvements and additions to water stations have been made at Willimantic, Watuppa and Yarmouth.

The work of strengthening bridges for heavier engines between Waterbury and Winsted and between Concord Junction and Lowell has been completed.

It is expected that the work on the new drawbridge over the Taunton river at Somerset will be completed in October, 1908.

The new double track roller lift drawbridge across the Niantic river at Niantic has been completed and put into service.

The long trestle between Saybrook Point and Fenwick has been filled in except three openings and the trestle at these openings has been rebuilt.

Work has been started gauntletting tracks across the Thames river bridge at New London to replace the present double tracks, the heavier trains now in service necessitating the further use of the bridge as a single track structure.

A new four track bridge is being built over Jackson street, Holyoke, in connection with the extension of that street by the city.

The double track steel bridge at Massachusetts avenue, Boston, has been renewed and the pier masonry extended for four tracks.

Bridge No. 27, over the Shetucket river at Willimantic, has been renewed.

The old bridge at Versailles has been replaced by a concrete arch. The new drawbridges on the Harlem river branch at Pelham bay and over the Bronx river have been practically completed.

Extensive bridge renewals have been made at other points.

The electrification of the line between East Hartford and Vernon and Melrose has been completed and electric operation inaugurated.

Additional protection against fire has been provided at freight houses Nos. 9, 10, 11 and 12, and also at the grain elevator at the Boston freight terminal.

Seven and one-half miles of tracks have been added to classification yards at Oak Point.

There has been no increase during the year in the capital stock issued, but the amount of stock outstanding in the hands of the public has been increased by the sale of 8,153 shares of treasury stock, the proceeds of which were used to acquire other property, making the amount,

at the close of the year.....\$ 97,895,700.00

The amount of capital stock authorized is.....\$188,936,400.00

Of which there is voted to be issued—

for 3½% convertible debentures of

Jan. 1, 1906.....\$20,000,000.00

for 6% convertible debentures of

Jan. 15, 1908.....39,029,600.00

Authorized by stockholders and directors

for the acquisition of stocks and

evidences of indebtedness of con-

trolled corporations.....3,936,400.00

Authorized by stockholders for lawful

purposes of the company subject

to the Board of Directors.....4,092,300.00

Total amount authorized, but as yet not issued.....\$ 67,058,300.00

Amount of capital stock issued.....\$121,878,100.00

Of which there is in the treasury of the company.....23,982,400.00

Leaving the amount outstanding in the hands of the

public.....\$ 97,895,700.00

The outstanding indebtedness of the company in the hands of the

public, excluding that assumed by the mergers occurring during the

year, has been increased during the year by the following:

N. Y., N. H. & H. R. R. Co.—H. R. & P. C. 1st.

mort. 4% bonds sold.....\$ 4,042,000.00

B. & N. Y. Air Line R. R. Co. 1st. mort. 4% bonds sold.....1,500,000.00

Providence Terminal Co. 1st. mort. 4% bonds sold.....1,124,000.00

N. Y., N. H. & H. R. R. Co. 3½% conv. debenture

certificates sold.....2,700.00

Naugatuck R. R. Co. 1st. mort. 4% bonds sold.....4,000.00

Installments received on subscriptions to 3½% con-

vertible debenture certificates of Jan. 1, 1906.....8,316,525.00

Installments received on subscriptions to 6% con-

vertible debentures of Jan. 15, 1908.....25,497,800.00

Three year 4½% debentures due May 5, 1911, sold...2,000,000.00

\$42,487,025.00

| | | |
|---|--------------|-----------------|
| <i>Less</i> | | |
| 4% conv. deb. certifs. 1893 issued paid..\$ | 53,000.00 | |
| 5% 4 year deb. paid in advance of maturity | 800,000.00 | |
| 5 1/4% 2 year deb. paid in adv. of maturity | 100,000.00 | |
| Various notes paid..... | 3,992,154.16 | 4,945,154.16 |
| | | \$37,541,870.84 |

An arrangement has been made for the further sale on advantageous terms to the company of the following treasury assets:

\$1,602,000 of Boston & New York Air Line R. R. Co. 4 per cent. first mortgage bonds.

\$2,176,000 of New Haven & Northampton Co. 4 per cent. refunding consolidated mortgage gold bonds.

\$160,000 of Pawtuxet Valley R. R. Co. 4 per cent. 1st mortgage bonds.

\$350,000 of Stafford Springs Street Railway Company 5 per cent. 1st mortgage bonds.

There will mature between October 20, 1908, and April 1, 1909, the following obligations for which the company is responsible, viz.:

| | |
|--|----------------|
| Two year 5% debentures..... | \$9,720,000.00 |
| Milford & Woonsocket 1st mort. 5% bonds..... | 60,000.00 |
| Milford, Franklin & Providence 1st mort. 6% bonds.... | 10,000.00 |
| New Haven & Northampton consolidated mortgage sinking fund 6% bonds..... | 1,117,000.00 |

Total\$10,907,000.00

The authorized expenditures of the company for improvements and equipment not completed and delivered on June 30, 1908

were\$14,780,713.73

Of which amount it is estimated there has been delivered and paid for material aggregating in value 1,750,000.00

Leaving yet to be paid.....\$13,030,713.73

In the meantime a portion of the surplus funds has been loaned at rates of interest to substantially offset the interest paid, and the remainder is in depositaries drawing current rates of interest.

There was in the treasury of the company \$1,766,000 of 3 1/2 per cent debentures of the Naugatuck Railroad Co., maturing October 1, 1930, of a total authorized issue of \$2,000,000. As the prospect for their sale at a satisfactory price was not encouraging, they were cremated under the supervision of the Custodians of Securities. The amount of this issue outstanding in the hands of the public is \$234,000.

In the general statement for the year ending June 30, 1907, reference was made to the necessity of raising funds to pay for authorized improvements and additional equipment and to provide for future needs of the company, and it was proposed to offer to the stockholders the right to subscribe at \$125 a share to additional stock in the proportion of one share of new stock for each four shares of old and to extend this right to the holders of the company's convertible debenture certificates dated January 1, 1906, proportionate to their rights as future stockholders. After this proposition was made, however, the business conditions throughout the country became so unsatisfactory as to cast considerable doubt upon the desirability of such a plan, and the directors voted to offer to the stockholders of record December 2, 1907, the right to subscribe for 6 per cent. convertible debentures at the rate of \$100 of the principal amount of such debentures for every three shares of stock held by them respectively; these debentures bearing date of January 15, 1908, payable January 15, 1948, and convertible into shares of the company's capital stock at any time when the books of the company are not closed for the transfer of stock, after January 15, 1923, and not later than January 15, 1948, at the rate of one share of such stock for each \$100 of the principal amount of such debentures. The right to subscribe was also extended to holders of the 3 1/2 per cent. convertible debenture certificates, convertible into stock between January 1, 1911, and January 1, 1916, and to holders of warrants for subscriptions for such debentures or of receipts for subscriptions for such debentures, upon which three installments had been paid, at the rate of \$100 of the principal amount of the 6 per cent. debentures for each \$450 of principal amount of the 3 1/2 per cent. convertible debenture certificates. The amount of the 6 per cent. debentures authorized to be issued was \$39,029,600, and payable in four installments of 25 per cent. each on January 15, 1908, July 15, 1908, January 15, 1909, and July 15, 1909, respectively. The favor with which this amended plan was met is attested by the fact that of the \$39,029,600 authorized issue \$38,585,400 was subscribed for, and while only \$19,292,700 has become due and payable, \$34,864,500 has been paid into the company's treasury.

The capital stock of the Old Colony Railroad Company has been increased during the year by the sale of 5,076 shares, the proceeds of which have been applied toward the reimbursement of expenditures for betterments by your company.

The lease of the Holyoke and Westfield Railroad to the New Haven and Northampton Company has been amended so as to provide for a fixed annual rental of \$46,000 and taxes, instead of a varying one according to earnings.

The following lines have been merged effective upon the dates named, and their outstanding obligations have been assumed and are included in this year's balance sheet:

The Village Water Company of Suffield, Conn., January 31, 1908.

The Stafford Springs Street Railway Company, June 30, 1908.

The New England Railroad Company, April 1, 1908.

An investment amounting to \$10,953,000 was made during the year ending June 30, 1907, in the Millbrook Company.

This represented the whole capital stock and indebtedness of the New York & Port Chester Railroad—the City and County Contract Company—the company having the contract for the construction of the New York, Westchester & Boston Railroad—and the control, represented by a large majority of the stock, bonds, notes and underwriting subscriptions of the New York, Westchester & Boston Railroad Company.

This control was obtained with the intention of completing the construction of either the New York & Port Chester Railroad, or the New York, Westchester & Boston Railroad, substantially in accordance with the original plans, and the work of construction will be prosecuted vigorously as soon as the litigation in which the New York, Westchester & Boston Railroad is involved can be terminated.

The decision in this litigation is expected before the close of the calendar year, and with the completion of the line it is hoped arrangements can be made which will enable the commuter business to be handled in a satisfactory and efficient manner.

This investment has been increased during the year ending June 30, 1908, by the amount of \$807,483.20 for additional securities of the Millbrook Company acquired, which company is the direct owner of all the securities of the other companies mentioned. The total amount of our investment on this account on June 30, 1908, was \$11,762,483.20.

Charles F. Cnoate resigned as director on November 8, 1907, and the vacancy was filled by the election of Amory A. Lawrence, of Boston.

Augustus S. May and John G. Parker resigned as directors on February 7, 1908, and the vacancies were filled by the election of Charles M. Pratt and Lewis Cass Ledyard, both of New York.

The faithful and efficient services of the officers and employees are hereby acknowledged.

By order of the Board of Directors,

CHARLES S. MELLETT,
President.

New Haven, Conn., September 18, 1908.

THE NEW ENGLAND NAVIGATION CO.

Income Account for Year Ending June 30, 1908.

| | |
|---|----------------|
| Gross earnings from operation..... | \$4,365,058.83 |
| Less operating expenses (88.96%)..... | 3,883,545.03 |
| Net earnings | 481,513.80 |
| Add income from other sources..... | 1,325,427.58 |
| Total income | \$1,806,941.38 |
| Deductions from income— | |
| Taxes | \$52,298.14 |
| Interest on bonds, debentures and other liabilities | 975,550.26 |
| Improvements on piers | 7,706.40 |

Total deductions from income.....\$1,035,554.80

Net income\$ 771,386.58

The following new steamers were placed in commission during the year: "New Haven" on July 8, 1907; "Bunker Hill" on July 17, 1907; "Old Colony" on November 22, 1907; "Commonwealth" on July 1, 1908.

The aggregate cost of these steamers was about \$3,500,000.

Central New England Railway Company.

Income Account for the Year Ending June 30, 1908.

| | |
|--|----------------|
| Operating revenue | \$2,108,786.96 |
| Operating expenses (80.86 per cent.)..... | 1,705,169.75 |
| Net operating revenue..... | \$403,617.21 |
| Taxes | 67,748.91 |
| | \$335,868.30 |
| Income from other sources..... | 63,897.63 |
| Total income | \$399,765.93 |
| Deductions from income— | |
| Rentals of leased lines..... | \$91,822.50 |
| Interest on bonds and other liabilities..... | 305,657.60 |
| Total deductions from income..... | 397,480.10 |
| Net income | \$2,285.83 |

The unfavorable business conditions which have prevailed, especially during the last six months of the year, resulting in diminished gross earnings, with the impossibility of obtaining a corresponding reduction in operating expenses, have disappointed the expectation of the payment of any interest on the general mortgage income bonds.

Statement of Earnings and Operating Expenses of the Steam Railroad in Detail.

For the Twelve Months Ending June 30, 1908.

| | |
|--|-----------------|
| Freight revenue | \$25,281,434.85 |
| Passenger Service Train Revenue— | |
| Passenger revenue | \$23,003,115.93 |
| Excess baggage revenue..... | 154,352.51 |
| Mail revenue | 740,612.14 |
| Express revenue | 2,176,916.71 |
| Milk revenue | 95,002.23 |
| Other passenger train revenue..... | 109,301.48 |
| | 26,279,301.00 |
| All other revenue from transportation..... | 229,948.03 |
| Revenue from operations other than transportation... | 1,259,463.38 |
| Total | \$53,050,147.26 |

| Operating Expenses. | |
|--|---------------|
| Maintenance of Way and Structures— | |
| Superintendence | \$203,229.06 |
| Ballast | 40,823.07 |
| Ties | 930,275.94 |
| Rails | 202,478.33 |
| Other track material | 318,227.20 |
| Roadway and track | 2,082,687.87 |
| Removal of snow, sand and ice | 88,418.57 |
| Tunnels | 814.40 |
| Bridges, trestles and culverts | 537,021.43 |
| Over and under grade crossings | 56,861.27 |
| Grade crossings, fences, cattle guards and signs | 111,439.14 |
| Snow, sand fences and snow sheds | 417.87 |
| Signal and interlocking plants | 346,915.87 |
| Telegraph and telephone lines | 18,629.66 |
| Electric power transmission | 60,079.40 |
| Buildings, fixtures and grounds | 597,224.18 |
| Docks and wharves | 82,926.48 |
| Roadway tools and supplies | 42,020.00 |
| Work equipment, repairs | 7,251.33 |
| Work equipment, renewals | 3,711.72 |
| Work equipment, depreciation | 34,242.00 |
| Injuries to persons | 13,268.05 |
| Stationery and printing | 4,986.64 |
| Other expenses | 93,375.93 |
| Maintaining joint tracks, yards, etc. . | 106,500.49 |
| Total maintenance of way and structures | 5,983,825.90 |
| Transportation Expenses— | |
| Superintendence | \$306,878.69 |
| Despatching trains | 156,866.82 |
| Station employees | 4,441,536.37 |
| Mail expenses | 20,422.83 |
| Coal and ore docks | 65,773.26 |
| Station supplies and expenses | 359,342.47 |
| Yard masters and their clerks | 381,691.47 |
| Yard conductors and brakemen | 1,024,104.24 |
| Yard switch and signal tenders | 225,675.65 |
| Yard supplies and expenses | 4,984.36 |
| Yard enginemen | 539,963.34 |
| Enginehouse expenses—yard | 114,744.57 |
| Fuel for yard locomotives | 801,183.69 |
| Water for yard locomotives | 41,710.86 |
| Lubricants for yard locomotives | 15,810.06 |
| Other supplies for yard locomotives | 13,217.03 |
| Operating joint yards and terminals | 340,489.74 |
| Operating joint tracks | 14,180.58 |
| Motormen | 58,109.73 |
| Road enginemen | 2,006,891.23 |
| Enginehouse expenses—road | 582,821.52 |
| Fuel for road locomotives | 4,515,050.36 |
| Water for road locomotives | 281,406.37 |
| Lubricants for road locomotives | 83,669.55 |
| Other supplies for road locomotives | 67,261.48 |
| Operating power plants | 127,111.93 |
| Purchased power | 39,986.15 |
| Road trainmen | 2,542,576.19 |
| Train supplies and expenses | 609,391.31 |
| Interlockers, block and other signals, operation | 548,641.92 |
| Crossing flagmen and gatemen | 394,785.26 |
| Drawbridge operation | 56,062.79 |
| Clearing wrecks | 66,571.33 |
| Telegraph and telephone | 159,959.15 |
| Operating floating equipment | 748,917.54 |
| Stationery and printing | 252,118.40 |
| Other expenses | 589,437.34 |
| Loss and damage—freight | 348,654.57 |
| Loss and damage—baggage | 3,738.39 |
| Damage to property | 30,046.32 |
| Loss and damage—by fire | 113,671.24 |
| Damage to stock on right of way | 2,280.56 |
| Injuries to persons | 522,076.82 |
| Boston harbor transfer | 5,690.20 |
| Total transportation expenses | 23,625,503.68 |
| Maintenance of Equipment— | |
| Superintendence | \$145,947.21 |
| Steam locomotives, repairs | 2,232,883.27 |
| Steam locomotives, renewals | 3,836.10 |
| Steam locomotives, depreciation | 161,838.98 |
| Electric locomotives, repairs | 24,960.26 |
| Passenger train cars, repairs | 1,082,442.33 |
| Passenger train cars, renewals | 4,785.38 |
| Passenger train cars, depreciation | 88,395.00 |
| Freight train cars, repairs | 1,143,457.21 |
| Freight train cars, renewals | 91,306.29 |
| Freight train cars, depreciation | 538,541.96 |
| Electric equipment of cars, repairs | 49,658.40 |
| Floating equipment—repairs | 307,233.35 |
| Floating equipment depreciation | 72,109.18 |
| Shop machinery and tools | 158,282.92 |
| Stationary engines in shops | 125,277.23 |
| Power plant equipment | 20,490.62 |
| Injuries to persons | 13,152.58 |
| Stationery and printing | 2,124.61 |
| Other expenses | 219,336.90 |
| Maintaining joint equipment at terminals | 781.56 |
| Equipment borrowed | 426,327.72 |
| Total maintenance of equipment | 6,913,169.06 |
| Traffic Expenses— | |
| Superintendence | 123,042.62 |
| Outside agencies | 52,190.73 |
| Advertising | 104,327.29 |
| Traffic associations | 3,101.30 |
| Stationery and printing | 28,452.12 |
| Other expenses | 110.00 |
| Total traffic expenses | 311,224.06 |
| General Expenses— | |
| Salaries and expenses of general officers | \$202,933.30 |
| Salaries and expenses of clerks and attendants | 531,990.23 |
| General office supplies and expenses | 37,334.38 |

| Law expenses | 248,268.99 |
|--|-----------------|
| Insurance | 108,599.25 |
| Pensions | 80,943.47 |
| Stationery and printing | 60,383.13 |
| Other expenses | 83,065.17 |
| General adm. joint tracks, yards and terminals | 26,316.73 |
| Total general expenses | 1,379,834.65 |
| Total operating expenses | \$38,213,557.35 |
| Net operating revenue | \$14,836,589.91 |
| Statistics. | |
| Passenger Traffic— | |
| Number of passengers carried earning revenue .. | 75,555,969 |
| Number of passengers carried one mile | 1,399,706,539 |
| Average distance carried, miles | 18.53 |
| T'l passenger revenue (excl. mails, express, etc.) | \$23,003,115.93 |
| Average amount received from each passenger .. | .30445 |
| Average receipts per passenger per mile | .01643 |
| Total passenger service train revenue | \$26,279,301.00 |
| Passenger service train revenue per mile of road. | 12,836.95 |
| Passenger service train revenue per train mile .. | 1,664.66 |
| Freight Traffic— | |
| Number of tons carried of freight earning revenue | 18,851,844 |
| Number of tons carried one mile | 1,787,661,842 |
| Average distance haul of one ton, miles | 94.83 |
| Total freight revenue (excluding miscellaneous) .. | \$25,281,434.85 |
| Average amount received for each ton of freight. | 1.34105 |
| Average receipts per ton per mile | .01414 |
| Freight revenue per mile of road | \$12,349.51 |
| Freight revenue per train mile | 3,430.49 |
| Total Traffic— | |
| Operating revenues | \$53,050,147.26 |
| Operating revenues per mile of road | 25,914.02 |
| Operating revenues per train mile | 2,308.9 |
| Operating expenses | \$38,213,557.35 |
| Operating expenses per mile of road | 18,666.62 |
| Operating expenses per train mile | 1,663.2 |
| Net operating revenue | \$14,836,589.91 |
| Net operating revenue per mile of road | \$7,247.40 |
| Train Mileage.—Revenue Service— | |
| Miles run by passenger trains | 15,606,114 |
| Miles run by freight trains | 7,189,200 |
| Miles run by mixed trains | 180,424 |
| Total revenue train mileage | 22,975,738 |
| Non-revenue service train miles | 1,254,978 |
| Grand total train mileage | 24,230,716 |
| Car Mileage, Etc.— | |
| Mileage of passenger cars | 71,794,131 |
| Mileage of loaded freight cars—north or east .. | 79,925,550 |
| Mileage of loaded freight cars—south or west .. | 49,762,018 |
| Mileage of empty freight cars—north or east .. | 17,538,922 |
| Mileage of empty freight cars—south or west .. | 44,020,873 |
| Average number of passengers per car mile | 19.49 |
| Average number of passengers per train mile | 88.66 |
| Average number of passenger cars per train mile. | 4.54 |
| Av'g number of tons of freight per loaded car mile | 13.78 |
| Average number of tons of freight per train mile | 242.57 |
| Average number of freight cars per train mile .. | 25.95 |
| Average number of loaded cars per train mile .. | 17.59 |
| Average number of empty cars per train mile .. | 8.35 |
| Average mileage operated during year | 2,047.16 |
| Improvements and Betterments. | |
| Real estate | \$445,908.46 |
| New Bridges— | |
| Lyme | \$97,970.49 |
| Stratford | 53,825.68 |
| Niantic | 48,162.55 |
| Shepaug | 24,534.08 |
| Sundry places | 70,478.71 |
| New Haven cut improvements | 294,971.51 |
| Waterbury improvements | 587,583.90 |
| Second track, western division | 519,572.46 |
| Readville shops | 382,777.04 |
| Providence tunnel | 215,456.07 |
| Electrification of New York division | 1,528,537.02 |
| Elimination grade crossings | 766,105.80 |
| Woodlawn, N. Y., improvements | 104,849.92 |
| West Roxbury-Needham improvements | 40,207.71 |
| Torrington improvements | 36,284.73 |
| New sidings | 26,487.03 |
| Sundry improvements | 27,757.76 |
| Total | 440,911.95 |
| New equipment, consisting of 71 steam locomotives, 9 electric locomotives, 106 coaches, 24 parlor cars, 17 composite, 13 baggage, 6 sleeping, 5 milk, 4 diners, 3 postal, 5,462 box, 4,500 coal, 650 flat, 22 box cars converted into cabooses | \$5,417,411.36 |
| Total steam railroad | 16,070,961.89 |
| Double tracking street railways | \$21,488,373.25 |
| Betterment of track, additional weight of rails, etc. | \$73,193.31 |
| Track extensions | 63,417.24 |
| Electrification new lines | 476,922.30 |
| Additional power | 159,035.01 |
| Miscellaneous | 436,587.91 |
| Total | 216,446.83 |
| New equipment, consisting of 48 open cars, 110 closed cars, 19 work cars, 12 snow plows and 1 rotary sweeper | —1,425,602.60 |
| Total street railways | 1,063,827.76 |
| Total | \$2,489,430.36 |
| Total | \$23,977,803.61 |
| These expenditures have been charged to— | |
| Cost of property | \$6,843,013.96 |
| Equipment | 15,555,525.66 |
| Profit and loss | 1,579,263.99 |
| Total | \$23,977,803.61 |

THE NEW YORK, NEW HAVEN & HARTFORD RAILROAD COMPANY, AND COMPANIES BOTH CONTROLLED AND DIRECTLY OPERATED.

General Balance Sheet, June 30, 1908.

| Assets. | | Liabilities. | |
|--|------------------|--|------------------|
| Cost of properties— | | Capital stock | \$121,878,100.00 |
| Railroads owned and operated..... | \$138,359,459.83 | Less in treasury..... | 23,982,400.00 |
| Railroad and floating equipment.... | 49,415,637.71 | | \$97,895,700.00 |
| Street railroads and equipment, including investments in Rhode Island Co., Connecticut Co. and New York & Stamford Ry. Co..... | 58,533,366.97 | Funded Debt— | |
| | \$246,308,464.51 | N. Y., N. H. & H. R. R. Co. debentures, including debentures of merged roads assumed (Exhibit V.)..... | \$173,595,750.00 |
| Investments in stocks of leased companies not controlled (Exhibit I.) | 9,205,642.19 | N. Y., N. H. & H. R. R. Co. bonded debt, including bonds of merged roads assumed (Exhibit VI.)..... | 56,849,000.00 |
| Investments in and advances to other companies wholly owned (Exhibit II.)..... | 27,741,230.49 | Bonded debt of constituent railroad companies (Exhibit VII.)..... | 2,108,000.03 |
| Other investments and advances (Exhibit III.)..... | 27,246,155.78 | | 232,552,750.00 |
| Real estate at Park square, Boston, and South street, New York, held for sale..... | 5,210,000.00 | Reserve for equipment and personal property taken over with leases..... | 7,630,482.96 |
| Advances to leased companies, not controlled, for improvements and betterments recoverable, or to be written off over terms of leases..... | 3,843,523.48 | Current Liabilities. | |
| Materials, fuel and other supplies..... | 4,595,170.43 | Traffic balances | \$2,507,154.44 |
| | | Audited vouchers | 4,354,239.76 |
| | | Bills payable | 55,700.00 |
| | | Miscellaneous accounts payable..... | 333,421.49 |
| | | Unpaid wages | 210,092.77 |
| | | Reserve for insurance and accident claims | 587,561.30 |
| | | Rentals of leased lines accrued..... | 202,940.25 |
| | | Interest due or accrued..... | 3,714,419.12 |
| | | Dividends due or accrued..... | 1,982,460.38 |
| | | | 13,947,989.51 |
| | | Special Funds. | |
| | | Insurance fund | \$1,012,933.64 |
| | | Accident and casualty fund..... | 259,148.00 |
| | | New Haven & Northampton Co. sinking fund | 935,172.08 |
| | | Connecticut Ry. & Lighting Co. sinking and special funds..... | 332,156.23 |
| | | Equipment replacement fund..... | 1,071,413.18 |
| | | | 3,610,823.13 |
| | | Profit and loss account..... | 12,860,490.18 |
| | | Contingent Liabilities: | |
| | | Joint liability with other roads for any deficiency on foreclosure of bonds of the Boston Terminal Co.: Guarantee to repay preferred stock of the Springfield Railway Companies \$3,387,950.00, and of the New England Investment & Security Co. \$4,000,000.00 at 105 on liquidation: | |
| | | Guarantee of principal and interest of the debentures of the Providence Securities Co. \$19,989,000: | |
| | | Guarantee of principal and interest of the gold debenture of the New England Navigation Co. in case of termination of lease of the Old Colony Railroad Co. \$3,600,000.00. | |
| | | | \$368,498,235.79 |
| Current Assets. | | | |
| Agents' and conductors' balances..... | \$2,019,449.56 | | |
| Accounts and Bills Receivable— | | | |
| Traffic balances | \$325,335.28 | | |
| Miscellaneous accounts | 4,340,955.74 | | |
| Bills receivable..... | 6,553,782.26 | | |
| | 11,220,073.28 | | |
| Marketable stocks and bonds (Exhibit IV.) | 4,433,151.00 | | |
| Cash— | | | |
| In banks and on hand..... | \$19,571,741.83 | | |
| On special deposit for payment of interest and dividends..... | 3,581,537.56 | | |
| | 23,153,279.39 | | |
| | 40,825,953.23 | | |
| Assets in Special Funds. | | | |
| Insurance fund (at cost)..... | \$1,188,598.32 | | |
| Accident and casualty fund (at cost)..... | 800,636.36 | | |
| New Haven & Northampton Co., sinking fund (at cost)..... | 935,172.08 | | |
| Harlem River & Port Chester R. R. Co. first mortgage bonds, special deposit..... | 247,520.00 | | |
| Connecticut Ry. & Lighting Co. sinking fund | 255,814.07 | | |
| | 3,427,740.83 | | |
| Deferred Charges to Income— | | | |
| Pier rentals, prepaid insurance, etc..... | 94,354.84 | | |
| | \$368,498,235.79 | | |

We have examined the books of the New York, New Haven & Hartford Railroad Company for the year ending June 30, 1908, and we find that the annexed balance sheet and relative income and profit and loss accounts are correctly prepared therefrom, including as investments the company's interests in companies wholly owned but separately operated and including in income only the dividends declared on these investments. On this basis we certify that these statements are in our opinion properly drawn up so as to set forth the true financial condition of the company at June 30, 1908, and the correct results of its operations for the year ending on that date, and that full provision has been made for the maintenance of the property.

54 William street, New York City, September 11, 1908.

PRICE, WATERHOUSE & Co.,
Chartered Accountants.BROOKLYN RAPID TRANSIT CO.—REPORT OF THE BOARD OF DIRECTORS TO THE STOCKHOLDERS
FOR THE YEAR ENDING JUNE 30, 1908.

85 CLINTON STREET, BROOKLYN, N. Y., September 1, 1908.

Comparative Statement of the Results of the Operations of the
Brooklyn Rapid Transit System for Years Ending June 30,
1908-1907.

| | 1908 | 1907 | Increase or Decrease |
|--|-----------------|-----------------|-------------------------|
| Gross earnings from operation | \$19,870,566.55 | \$19,381,587.15 | \$488,979.40 |
| Operating expenses | 11,939,578.59 | 11,465,704.76 | 473,873.83 |
| Net earnings from operation | 7,930,987.96 | 7,915,882.39 | 15,105.57 |
| Income from other sources | 677,823.94 | 555,165.93 | 122,658.01 |
| Total income | 8,608,811.90 | 8,471,048.32 | 137,763.58 |
| Less taxes and fixed charges | 6,534,938.62 | 6,026,386.72 | 508,551.90 |
| Net income | 2,073,873.28 | 2,444,661.60 | — 370,788.32 |
| Out of which was taken for betterments and additions to property | 229,781.18 | 442,063.37 | — 212,282.19 |
| Surplus for the year... | 1,844,092.10 | 2,002,598.23 | — 158,506.13 |

Add for judgment recovered from city of
New York account
wire privileges

| | | | |
|--|--------------|--------------|-----------------------|
| | 1,844,092.10 | 2,042,396.56 | 39,798.33 — 39,798.33 |
| Surplus at June 30, 1907-1906 | 3,734,006.48 | 2,075,562.81 | 1,658,443.67 |
| Surplus June 30, 1908, and June 30, 1907.. | 5,578,098.58 | 4,117,959.37 | 1,460,139.21 |
| Of this amount there has been appropriated: | | | |
| In depreciation adjustments | | 12,127.65 | — 12,127.65 |
| For discount on bonds sold | 1,457,173.42 | 371,825.24 | 1,085,348.18 |
| In depreciation in securities comprising guaranty fund | 250,835.00 | | 250,835.00 |
| Old accounts written off, etc..... | 16,630.26 | | 16,630.26 |
| Total appropriations | 1,724,638.68 | 383,952.89 | 1,340,685.79 |
| Balance surplus June 30, '08, and June 30, '07 | 3,853,459.90 | 3,734,006.48 | 119,453.42 |

Divisional statement given below shows comparative gross earnings for the last three fiscal years:

| | 1908 | 1907 | Increase | Per Cent.* | 1906 | Increase | Per Ct.† |
|-----------------------------------|--------------|--------------|-----------|------------|--------------|-------------|----------|
| Passenger: | | | | | | | |
| Surface | \$11,543,902 | \$11,323,084 | \$220,908 | 1.95 | \$11,531,125 | \$12,867 | .11 |
| Elevated and bridge | 7,386,172 | 7,120,899 | 265,273 | 3.73 | 6,055,597 | 1,330,575 | 21.97 |
| Freight, express, mail, etc. | 785,198 | 789,180 | 3,982 | .50 | 740,799 | 44,399 | 5.99 |
| Advertising | 155,205 | 148,424 | 6,781 | 4.57 | 145,807 | 9,398 | 6.45 |
| Total | \$19,870,567 | \$19,381,587 | \$488,980 | 2.52 | \$18,473,328 | \$1,397,239 | 7.56 |

*1908 over 1907.

†1908 over 1906.

The following is a comparative statement of gross earnings from operation for seven years beginning July 1, 1901, and ending June 30, 1908:

| Year ending June 30, | | Increase over previous twelve months, |
|----------------------|--------------|---------------------------------------|
| 1902 | \$12,510,622 | 5.13 per cent. |
| 1903 | 13,280,321 | 6.15 " |
| 1904 | 14,755,158 | 11.10 " |
| 1905 | 16,333,444 | 10.69 " |
| 1906 | 18,473,328 | 13.10 " |
| 1907 | 19,381,587 | 4.92 " |
| 1908 | 19,870,567 | 2.52 " |

Summary of Construction Expenditures Brooklyn Rapid Transit System, Fiscal Years 1908-1907.

| | 1908 | 1907 |
|--------------------------------------|----------------|----------------|
| Right of Way | \$25,177.32 | \$84,784.72 |
| Track and roadway construction | 1,607,618.11 | 1,934,453.57 |
| Electric line construction | 529,795.80 | 495,688.36 |
| Real estate | 48,117.30 | 37,367.20 |
| Buildings and fixtures | 465,501.51 | 728,209.56 |
| Power plant | 1,948,252.38 | 1,434,318.86 |
| Shop tools and machinery | 11,150.35 | 134,623.73 |
| Cars and electrical equipment | 1,821,970.47 | 762,787.39 |
| Miscellaneous equipment | 1,052.65 | 13,166.48 |
| Miscellaneous | 18,323.14 | 77,786.17 |
| | \$6,476,959.03 | \$5,703,186.04 |

The total earnings from operation of the entire system for the twelve months ending June 30, 1908, were \$19,870,566.55, an increase of 2.52 per cent. over the previous fiscal year.

The percentage of operating cost to earnings, including special appropriations for additions and betterments to the property was 61.25 per cent. as compared with 61.42 per cent. for the previous year.

The net earnings from operation, deducting improvements and betterments, were \$7,701,206.78.

The net surplus, after making all deductions, as shown on preceding page, was \$1,844,092.10, equal to 4.10 per cent. on the capital stock of the Brooklyn Rapid Transit Company.

There were carried 515,184,967 passengers for the fiscal year ending June 30, 1908, an increase of 3,345,530.

The average gross earnings per passenger were 3.67 cents.

The average cost per passenger carried was 2.25 cents, leaving an average net per passenger of 1.42 cents, from which must be taken all charges other than for operation.

The average number of cars operated daily for the twelve months ending June 30, 1908, was 2,203, an increase of 5.2 per cent.

The average gross passenger earnings per car-mile were 25.7 cents, as compared with 27.0 cents for the fiscal year ending June 30, 1907, a decrease of 4.8 per cent.

The total trips run for the fiscal year ending June 30, 1908, was 6,148,774, an increase of 4.3 per cent. over corresponding period of 1907.

The daily average passengers per car for the fiscal year ending June 30, 1908, was 639, a decrease of 4.6 per cent. over the corresponding period ending June 30, 1907.

The increase in damages and legal expenses is attributable to the disposal of a much larger number of impending cases and claims than in the preceding year. Accidents of car collisions decreased 37 2-10 per cent.; car and vehicles, 23 1-10 per cent.; boarding and lighting, 9 3-10 per cent., and from negligence in handling cars 8 3-10 per cent.

IMPROVEMENTS AND ADDITIONS TO PROPERTY.

ROLLING STOCK.

New Equipment.—Additional elevated motor and surface closed passenger cars, one hundred (100) of each type, the orders for which were referred to in last report, have been received and placed in service. One (1) steel motor car for elevated service has been received and will be placed in service early next fall.

No additional cars were ordered during the year.

Surface Car Vestibules.—All surface passenger cars are vestibuled as required by law, 296 cars having been thus equipped during the past year.

POWER PLANT.

Power Stations.—The extension of the Williamsburg power station building to accommodate the additional units contracted for last year is practically completed. The capacity of the station has been increased 12,000 k.w. by the installation of one 10,000 k.w. turbo generator unit and the enlargement of one 5,500 k.w. turbo generator unit to 7,500 k.w., and the necessary auxiliary equipment in connection therewith has been installed.

Two additional high-tension feeder equipments and one additional set of exciters have been installed.

The enlargement of the Williamsburg power station and construction of additional sub-stations has enabled the company to discontinue the regular operation of the Third avenue and 39th street

power stations. These plants, however, will serve as reserve stations.

The operation of the Brooklyn bridge power station has been abandoned and the property turned over to the city by reason of the discontinuance of local service on the Brooklyn bridge railway.

Sub-stations.—Six (6) sub-stations were completed and put in operation.

The capacity of the bridge and Canarsie sub-stations has been increased by 3,000 and 1,000 k.w. respectively, the former building having been enlarged to provide for an ultimate capacity of 13,000 k.w. The construction of proposed sub-stations at Wyckoff avenue and Palmetto street, Ridgewood, and 38th street and Fifth avenue has not yet commenced.

Subway Conduits and Feeders.—2.25 miles of underground conduits, or a total of 17.5 miles of duct were constructed; 3.88 miles of high tension feeder cable and 3.31 miles of low tension feeder cable were installed in subway conduits. The length of overhead feeder wires was reduced by 8.5 miles, 63.5 miles of cable having been removed and 55 miles of cable erected. 127 miles of trolley wires were erected.

ELEVATED TRACK IMPROVEMENTS.

Williamsburg Bridge.—The connection between the Broadway elevated and the bridge structure on the Plaza has been completed and tracks laid thereon. Test elevated trains have been operated over the Williamsburg bridge, and it is expected that the Manhattan terminal will be completed during the early fall and through service established.

Brooklyn Bridge.—Improvements in the Manhattan terminal were completed and through service inaugurated on January 26, 1908, during all hours. On the same date the local service was transferred from the bridge railway to the surface tracks on the roadway. The track lay-out at the Brooklyn terminal and in the bridge yard has been re-arranged for the better handling of trains. The elevation of the surface tracks entering and leaving the bridge has been undertaken by the city and is now nearing completion. This will eliminate traffic congestion in Sands street, at the entrance to the bridge, and greatly facilitate the movement of surface cars.

Structural Re-painting.—The work of cleaning and re-painting 15,000 lineal feet of elevated structure was completed.

Renewal of Tracks.—Twenty-six (26) pieces of special track work have been renewed, and the running rails on Brooklyn bridge have been relaid with the company's 80-lb. standard.

Interlocking Signals.—Electro-pneumatic interlocking signals have been installed at three points, viz., on the Brighton Beach line at King's Highway, at the Park row terminus of the Brooklyn bridge, and on Broadway elevated structure at the Williamsburg bridge connection. Work is progressing on a similar plant at the Brooklyn terminal of the Brooklyn bridge.

Mechanical signal plants have been provided on the Brighton Beach line at Church avenue and at Neptune avenue, at the Metropolitan avenue terminus of the Lutheran cemetery railroad, and at the Broadway ferry terminus of the Broadway elevated line.

Station Improvements.—The elevated structure in Flatbush avenue at the Long Island railroad terminal has been raised 4½ ft. to provide for additional stairways, to accommodate the increased traffic due to subway operation.

Station buildings and platforms have been constructed on the Canarsie line at Rockaway and Flatlands avenues, thus enabling the collection of fares by ticket agents. Four stations have also been erected on the Lutheran cemetery line, viz., at Covert and Forest avenues, Fresh Pond road and Metropolitan avenue terminus.

Brighton Beach Improvement.—The work of eliminating grade crossings on the Brighton Beach division, between Church avenue and Brighton Beach, and the four-tracking of the line is substantially completed, and service was inaugurated on the express tracks on May 30, 1908.

The reconstruction of that section of the Brighton Beach line between Fulton street and St. Marks avenue is complete. The stations at Brighton Beach, Ocean Parkway and Culver terminal have been remodeled to enable the collection of fares by ticket agents.

SURFACE TRACKS AND STRUCTURES.

Brooklyn Bridge.—Surface loops were constructed at the Brooklyn terminal and local trolley service inaugurated January 26, 1908.

A temporary track has been constructed across the bridge property near Tillary street, connecting Fulton street tracks with those of the Coney Island and Brooklyn railroad, pending completion of the improvements for operation of surface cars on the bridge structure.

Williamsburg Bridge.—The subway terminal at the Manhattan end is completed and surface cars are now being operated therefrom.

Livingston Street and Lafayette Avenue Extensions.—4,450 lineal feet of double track were constructed in Livingston street, between Court street and Flatbush avenue, and in Lafayette avenue, between Flatbush avenue and Fulton street, with connections at Court street, Boerum place, Flatbush avenue, and Fulton street.

2,400 lineal feet of double track have been relaid in Fulton street, between Court square and Flatbush avenue, these tracks being laid on steel ties embedded in concrete.

58 pieces of special track work were renewed.

Freight Sidings.—Six (6) sidings were laid for handling of freight business, and arrangements entered into with the Long Island Railroad Company for the interchange of freight near Gravesend avenue at Parkville.

Welded Joints.—Twelve and six-tenths (12.6) miles of single tracks have been electrically welded; 4.94 miles of double track improved pavement have been laid.

Grade Crossings Eliminated.—The improvement of the Bay Ridge division of the Long Island Railroad has eliminated the grade crossings at Ocean and Rockaway avenues.

Curbing of Gravesend and Ocean Avenues.—The tracks on Gravesend avenue have been brought to the new grade established by the city, and curbing is being installed outside of the tracks to define the right-of-way and eliminate interference by street traffic, confining all vehicles to regular street crossings. Similar improvement is being made on Ocean avenue, between Avenue G and King's Highway.

Eighty-sixth Street Improvement.—A substantial change of grade in the tracks on Eighty-sixth street, between Thirteenth and Seventeenth avenues, involving a fill of approximately 30,000 yards under the company's tracks, has been completed.

New Buildings.—The Maspeth depot, including repair shop and office quarters, was completed and occupied early last fall, the old depot building having been removed and storage tracks constructed on its site.

Buildings to provide quarters for track and line departments, store-room, stables, etc., on Nostrand avenue at Carroll street, are nearing completion.

An inspection building for elevated equipment at the intersection of Lutheran Cemetery railroad and Fresh Pond road was completed and equipped, and has been in use since last fall.

Canarsie Storage Yard.—Additional car storage tracks have been installed at the Canarsie depot.

Eastern Power Station Dock.—The timber and pile dock in the rear of the eastern power station is being reconstructed, and the timber ash pocket will be replaced with a steel and concrete structure.

CAR OPERATION.

Surface Car Operation.—The opening of the subway to Flatbush avenue and the construction of the Livingston street and Lafayette avenue tracks and Tillary street connection has necessitated the re-routing of several surface lines. Certain cars are now operated to the Borough Hall and Fourth avenue loops, which formerly ran through to Park Row, Manhattan. Avenue C service, discontinued last year by reason of the Brighton Beach improvement work, has been resumed.

PUBLIC SERVICE COMMISSION INVESTIGATION.

The Public Service Commission for the First District, created under the law enacted by the legislature of 1907, began investigation of the companies comprised in the Brooklyn Rapid Transit system shortly after taking office at the opening of the fiscal year.

A corps of accountants in the employ of the commission was assigned to the work, and for a period of three months occupied quarters and had free access to the records in the general offices of the company. During the same period public inquiries were conducted by special counsel of the commission at sittings presided over by one or more members of that board, at which questions bearing on the financial history of the companies in the system from their beginning down to date of inquiry, their relations to the holding company and each other, capitalization, character of leases, extent of ownership by the Brooklyn Rapid Transit Company and how acquired, methods of accounting and operation, physical conditions, etc., were thoroughly gone into. The commission had the fullest co-operation of the company throughout the investigation, which fell short of being completed, if at all, in that no public announcement of the commission's findings was made at the conclusion of the proceedings. It is gratifying, however, to be assured that the result was altogether favorable to the system, by, among other things, imparting to the public a fuller knowledge of its operations, financial affairs and policy, than would have been otherwise possible, and so clearing away many false impressions which had become more or less fixed in the public mind.

TRAFFIC CONDITIONS.

It will be noted that the general business depression is reflected in the earnings of the company. From an almost unbroken daily record of increase, running through more than five consecutive years and keeping pace with large expenditures for improvements, there has come a falling off of gross earnings beginning with the last quarter of 1907 and increasing with the downward trend of conditions generally

through the balance of the fiscal year. While the loss is distributed over the entire system, it is more acutely felt during the summer months on lines serving seaside resorts.

The opening of the subway for regular operation between Battery Park and the terminus at Flatbush and Atlantic avenues has somewhat affected the revenue of certain lines, but no materially harmful results to the business of the company were manifested and none are expected from this addition to the lines of communication between Manhattan and Brooklyn.

However seriously the prevailing depression may for the time being affect the business of the system, full restoration and the continued growth of traffic demands in Brooklyn are as certain as the operation of any natural law; but whether the whole local transit situation of Greater New York is not seriously imperiled by the trend toward zero of net per passenger carried is a question of vital importance to the companies concerned and to the public dependent upon them for continued development of transit facilities.

For some years past, through mergers, leases and other forms of combination, segregated lines have been coming together into large systems, unquestionably to the very great advantage of public travel, whatever may be said concerning the movement in other respects. Encouraged by the rapidly increasing demand for more and better local transportation, and the assumption that the gross rate of five cents for the carrier could be substantially preserved, enormous expenditures have been made in the improvement of existing facilities and creation of still more costly means of transit, and these vastly enhanced conveniences turned to public use without increase in the rate of fare. On the contrary, through the growth of transfers the average gross return per passenger has been decreasing until the cost of transportation supplied per capita and the amount received for it have come unpleasantly close to each other. It is obvious that these conditions cannot continue without serious results alike to the public and the transportation companies.

If private capital is to be the means of further transit development in this city, the investor must first be assured of the safety of his money and a reasonable return thereon. The case is exceptional where this can be given on the present margin between cost and, after transfer dilution, amount realized per passenger carried.

The welfare of the public to the extent that it is dependent upon local transportation, as well as that of the corporations which are expected to supply it, would be promoted by the mutual recognition of a situation, the undeniably discouraging aspect of which in its bearings on the question of future development must become evident to those who will give it patient and intelligent examination.

BRIDGE TRAFFIC.

The trackage over the two East River bridges now in service, while constituting a part of the operating routes of the many lines converging at the Brooklyn terminus, is distinguished from the rest of the system by inherent conditions both troublesome and costly to deal with, from the operation of which no adequate revenue return is derived. The relative importance of this distinctly peculiar feature of your company's situation increases with the opening of new bridges and growth of traffic between Brooklyn and Manhattan. Over 12 per cent. of the 73,674,770 total car miles during the last fiscal year, or about 9,000,000 car miles were made on the two bridges. This very considerable part of the total car movement was through a traffic desert, save the comparatively small receipts in half-fares from passengers riding between bridge ends. In other words, the Brooklyn system, after running its cars to the boundary of its traffic territory, adds an average of about 12 per cent. actual service at greatly increased relative cost without extra charge to the passenger.

During the fiscal years 1900 to 1907, inclusive, after crediting the account with all revenue from local bridge traffic the Brooklyn system has paid out nearly \$5,000,000 for charges attaching exclusively to bridge maintenance and operation. No charge applying generally to the system as a whole nor of more than \$700,000 paid for various fixtures supplied to the bridges to aid in the handling of that business is taken into this account.

INSURANCE.

The physical condition of your properties is reflected by the downward trend in the insurance rate, which from 1.35 in 1901-2 and 76-100 in 1905 is now slightly above $\frac{1}{2}$ of 1 per cent. During the year \$32,906.50 was added to the insurance reserve fund, which now amounts to \$84,334.77. It is proposed to rapidly build up this fund until under a plan for co-insurance each company comprised in the system shall be able to carry a large part or all of its own risks.

REFUNDING BONDS.

To June 30, 1908, there had been authenticated and delivered under the first refunding gold mortgage of the Brooklyn Rapid Transit Company to the Central Trust Company of New York, trustee, dated July 1, 1902, bonds aggregating in amount \$42,350,000, all bearing four (4) per cent. interest. This was an increase during the fiscal year of \$9,648,000, of which \$7,730,658.99 were issued for certificates of indebtedness of constituent companies and \$1,917,341.76 were issued for stocks of constituent companies. The certificates of indebtedness were issued at par and covered the actual cost of additions and improvements by constituent companies, all of which with the exception of certificates aggregating \$2,138,507.01, are secured by the mortgages of the constituent companies.

Of the \$42,350,000 of bonds issued to June 30, 1908, \$33,557,000

In par value of bonds have been sold, realizing \$27,256,754.68, or \$6,300,245.32 less than the amount actually expended by the company for additions and improvements under the terms of the mortgage. The remaining bonds have been issued for stocks and bonds of constituent companies or are in the treasury undisposed of.

There were in the treasuries of all companies unsold at the beginning of the fiscal year, June 30, 1907, Brooklyn Rapid Transit refunding gold mortgage 4 per cent. bonds \$4,624,000. There were issued during the fiscal year ending June 30, 1908

Total available \$14,272,000
Of these there were sold during the year 4,500,000

Leaving on hand June 30, 1908 \$9,772,000

Of these there were owned by the Brooklyn Rapid Transit Company, \$8,793,000 par value and by the Nassau Electric Railroad Company, \$979,000 par value.

In addition there had been expended to June 30, 1908, \$3,186,486.95, for which bonds may be issued.

The net amount of discount, etc., on bond sales during the year was \$1,457,173.42, all of which, as appears from the statement, [see page 1127] has been charged against the accumulated surplus.

By order of the Board,

EDWIN W. WINTER,
President.

Comparative Summary of Operations for Year Ending June 30, 1908-7.

| | 1908. | 1907. | Increase. | Per cent |
|---------------------------|---------------|---------------|-------------|----------|
| Gross earnings— | | | | |
| Passenger | 18,930,164.18 | 18,443,983.27 | 486,180.91 | 2.64 |
| Freight, mail and exprs.. | 315,719.08 | 349,538.93 | *33,819.85 | 9.68 |
| Advertising | 155,204.65 | 148,424.16 | 6,780.49 | 4.57 |
| American Ry. Traffic Co. | 469,478.64 | 439,640.79 | 29,837.85 | 6.79 |
| T'l earnings, operation | 19,870,566.55 | 19,381,587.15 | 488,979.40 | 2.52 |
| Operating expenses— | | | | |
| Maint. way and struct.. | 1,020,103.81 | 860,075.38 | 160,028.43 | 18.61 |
| Maint. of equipment... | 1,837,550.29 | 1,786,731.06 | 50,819.23 | 2.84 |
| Operation of power plant | 1,653,727.74 | 1,655,400.38 | *1,672.64 | .10 |
| Operation of cars—train- | | | | |
| men's wages | 3,369,858.95 | 3,238,970.65 | 130,888.30 | 4.04 |
| Operation of cars—other | | | | |
| expenses | 1,609,897.62 | 1,554,849.58 | 55,048.04 | 3.54 |
| Damages and legal expns. | 1,242,361.24 | 1,126,248.34 | 116,112.90 | 10.31 |
| General expenses | 651,669.03 | 643,898.78 | 7,770.25 | 1.21 |
| Freight, mail and express | | | | |
| —expenses | 190,885.29 | 233,667.33 | *42,782.04 | 18.31 |
| American Ry. Traffic Co. | | | | |
| —expenses | 363,524.62 | 365,863.26 | *2,338.64 | .64 |
| T'l operat'g expenses... | 11,939,578.59 | 11,465,704.76 | 473,873.83 | 4.13 |
| Net earnings, operation | 7,930,987.96 | 7,915,882.39 | 15,105.57 | .19 |
| Income, Other Sources— | | | | |
| Rent, land and buildings | 63,836.85 | 68,490.32 | *4,653.47 | 6.79 |
| Rent, track and struct.. | 101,419.29 | 125,865.31 | *24,446.02 | 19.42 |
| Miscellaneous | 512,567.80 | 360,810.30 | 151,757.50 | 42.06 |
| Total income | 8,608,811.90 | 8,471,048.32 | 137,763.58 | 1.63 |
| Deductions— | | | | |
| Taxes | 930,007.47 | 893,782.44 | 36,225.03 | 4.05 |
| Interest and rentals—net. | 5,604,931.15 | 5,132,604.28 | 472,326.87 | 9.20 |
| Total deductions.... | 6,534,938.62 | 6,026,386.72 | 508,551.90 | 8.44 |
| Net income | 2,073,873.28 | 2,444,661.60 | *370,788.32 | 15.17 |
| Special appropriations.. | 229,781.18 | 442,063.37 | *212,282.19 | 48.02 |
| Surplus | 1,844,092.10 | 2,002,598.23 | *158,506.13 | 7.92 |

* Decrease.

CONSOLIDATED GENERAL BALANCE SHEET, JUNE 30, 1908.

| | |
|--|------------------|
| Cost of road and equipment..... | \$120,753,015.56 |
| Properties owned in whole or in part by B. R. T. Co. | |
| Advances account of construction for leased companies | 9,991,668.01 |
| The Brooklyn City Railroad Co..... | \$8,565,616.63 |
| Prospect Park & Coney Island R. R. Co. | 1,426,051.38 |
| Construction expenditures, constituent companies | 2,586,600.85 |
| To be reimbursed by issuance of B. R. T. 1st refunding gold mortgage 4% bonds, upon deposit with Central Trust Co., trustee, of certificates of indebtedness to cover. | |
| Guaranty fund (securities and cash)..... | 3,754,920.00 |
| Underlying bonds deposited with Central Trust Co., trustee | 379,000.00 |
| Treasury bonds | 10,460,500.00 |
| B. R. T. 1st ref. gold mortgage 4% | \$9,757,000.00 |
| Other issues | 703,500.00 |
| Treasury stock | 146,228.00 |
| Current assets | 4,404,753.53 |
| Cash on hand | 2,583,330.79 |
| Due from companies and individuals. | 632,075.06 |
| Construction materials and general supplies on hand..... | 902,784.55 |
| Real estate mortgages..... | 22,500.00 |
| Prepaid accounts | 163,463.13 |
| Harway Improvement Co. stock..... | 100,600.00 |
| Bonds and cash in escrow..... | 57,120.00 |
| Accounts to be adjusted | 84,962.84 |
| | \$152,618,768.79 |

NOTE.—The certificates of indebtedness issued by constituent companies, aggregating \$33,407,927.28 against which B. R. T. bonds have been issued, do not appear separately on this consolidated balance sheet, as the property purchased appears as an asset under the head

of "Cost of Road and Equipment," and "Advances Account of Construction for Leased Companies," and the liability is represented by the bonds of the Brooklyn Rapid Transit Company, issued from time to time as such certificates of indebtedness are acquired and deposited with the Central Trust Co., trustee.

CONSOLIDATED GENERAL BALANCE SHEET, JUNE 30, 1908.

| | |
|--|------------------|
| Capital stock | \$45,835,908.95 |
| Brooklyn Rapid Transit Co..... | \$45,000,000.00 |
| Outstanding capital stock of constituent companies | 835,908.95 |
| Bonded debt and real estate mortgages..... | 95,203,680.00 |
| Brooklyn Rapid Transit Co..... | 49,350,000.00 |
| Bonded debt of constituent companies: | |
| The Brooklyn Heights R. R. Co..... | 250,000.00 |
| The Nassau Electric R. R. Co..... | 15,000,040.00 |
| Brooklyn, Queens Co. & Sub. R. R. Co. | 6,624,000.00 |
| Brooklyn Union Elevated R. R. Co.. | 23,000,000.00 |
| Sea Beach Railway Co..... | 650,000.00 |
| Real estate mortgages..... | 329,640.00 |
| Current liabilities | 7,337,855.45 |
| Audited vouchers | 1,408,320.66 |
| Due companies and individuals..... | 79,125.40 |
| Taxes accrued and not due..... | 1,146,971.93 |
| Interest and rentals accrued and not due | 703,437.46 |
| Bills payable | 4,000,000.00 |
| Contractors' deposits | 42,120.00 |
| Long Island Traction Co. trust fund | 9,300.15 |
| Accounts to be adjusted..... | 54,210.70 |
| Insurance reserve fund..... | 84,334.77 |
| Depreciation reserve fund | 42,642.34 |
| Contingent reserve fund | 155,256.50 |
| Surplus | 3,853,459.90 |
| | \$152,618,768.79 |

Bonded Debt and Real Estate Mortgages, Brooklyn Rapid Transit and Constituent Companies.

| Class of bonds. | Amount Authorized. | Amount Outstanding. | Rate per cent. | Interest when payable. | Annual Interest. |
|--|--------------------|---------------------|-----------------|------------------------|------------------|
| Brooklyn Rapid Transit: | | | | | |
| Fifty (50) year gold.. | \$7,000,000 | \$7,000,000 | 5 | A-O | \$350,000 |
| *1st ref. gold mtge.... | 150,000,000 | 42,350,000 | 4 | J-J | 1,694,000 |
| The Bklyn Heights R. R.: | | | | | |
| 1st mortgage | 250,000 | 250,000 | 5 | A-O | 12,500 |
| Bklyn, Queens Co. & Sub.: | | | | | |
| 1st mortgage | 3,500,000 | 3,500,000 | 5 | J-J | 175,000 |
| 1st consol. mtge..... | 4,500,000 | 2,884,000 | 5 | M-N | 144,200 |
| Jamaica & Brooklyn: | | | | | |
| Mortgage | 240,000 | 240,000 | 5 | J-J | 12,000 |
| Sea Beach Railway: | | | | | |
| Consol. mortgage..... | 650,000 | 650,000 | 4 | M-S | 26,000 |
| Nassau Electric R. R.: | | | | | |
| 1st mortgage | 660,000 | 660,000 | 5 | A-O | 33,000 |
| 1st consol. mtge..... | 15,000,000 | 10,726,040 | 4 | J-J | 429,040 |
| Atlantic Ave. R. R.: | | | | | |
| 1st consol. mtge..... | 730,000 | 730,000 | 5 | A-O | 36,500 |
| Gen. consol. mtge..... | 2,241,000 | 2,241,000 | 5 | A-O | 112,050 |
| Improvement mtge.... | 220,000 | 220,000 | 5 | J-J | 11,000 |
| Brooklyn, Bath & W. E.: | | | | | |
| General mortgage..... | 121,000 | 121,000 | 5 | A-O | 6,050 |
| 1st mtge., Series B.... | 250,000 | 250,000 | 5 | A-O | 12,500 |
| 2d mortgage | 52,000 | 52,000 | 5 | J-D | 2,600 |
| Brooklyn Union El.: | | | | | |
| 1st mortgage | 16,000,000 | 16,000,000 | 4-5 | F-A | 800,000 |
| Kings Co. El. R. R.: | | | | | |
| 1st mortgage | 7,000,000 | 7,000,000 | 4 | F-A | 280,000 |
| Totals | \$94,874,040 | | | | \$4,136,440 |
| Average rate of interest on bonded debt | | | 4 ³⁰ | | |
| Real estate mortgages..... | | 329,640 | | | 7,583 |
| Average rate of interest on real estate mortgages | | | 2 ³⁰ | | |
| Total bonded debt and real estate mortgages | | \$95,203,680 | | | \$4,144,023 |
| Average rate of interest on bonded debt and real estate mortgages... | | | 4 ³⁰ | | |

*Of the \$150,000,000 first refunding gold mortgage bonds of the Brooklyn Rapid Transit Company, \$53,286,000 are reserved for the purpose of purchasing, taking up, exchanging, or retiring bonds now issued, or to be issued, under mortgages of constituent companies; and an additional amount of \$7,000,000 is reserved for taking up and eventually retiring the outstanding \$7,000,000 5 per cent. fifty year gold mortgage bonds of the Brooklyn Rapid Transit Company.

†Of the \$15,000,000 first consolidated mortgage bonds of Nassau Electric Railroad, \$4,274,000 are reserved to retire prior lien bonds of Nassau, Atlantic Avenue and B. B. & W. E. R. R. companies.

‡Five per cent. since February 1, 1905.

Bonded Indebtedness Brooklyn City R. R. Co.

| Class of Bonds. | Amount Authorized. | Amount Outstanding. | Rate % | Interest when payable. | Annual Interest. |
|------------------------|--------------------|---------------------|--------|------------------------|------------------|
| Brooklyn City R. R. | | | | | |
| 1st consol. mtge. | \$6,000,000 | \$6,000,000 | 5 | J-J | \$300,000.00 |
| N. Wmsbg. & Flatbush | | | | | |
| 1st mortgage..... | 200,000 | 200,000 | 4½ | F-A | 9,000.00 |
| Greenpoint & Lorimer | | | | | |
| 1st mortgage..... | 125,000 | 125,000 | 6 | M-N | 7,500.00 |
| Brooklyn City R. R. | | | | | |
| Co. refunding mtge. | 6,925,000 | 600,000 | 4 | F-A | 24,000.00 |
| Totals | \$13,250,000 | \$6,925,000 | | | \$340,500.00 |